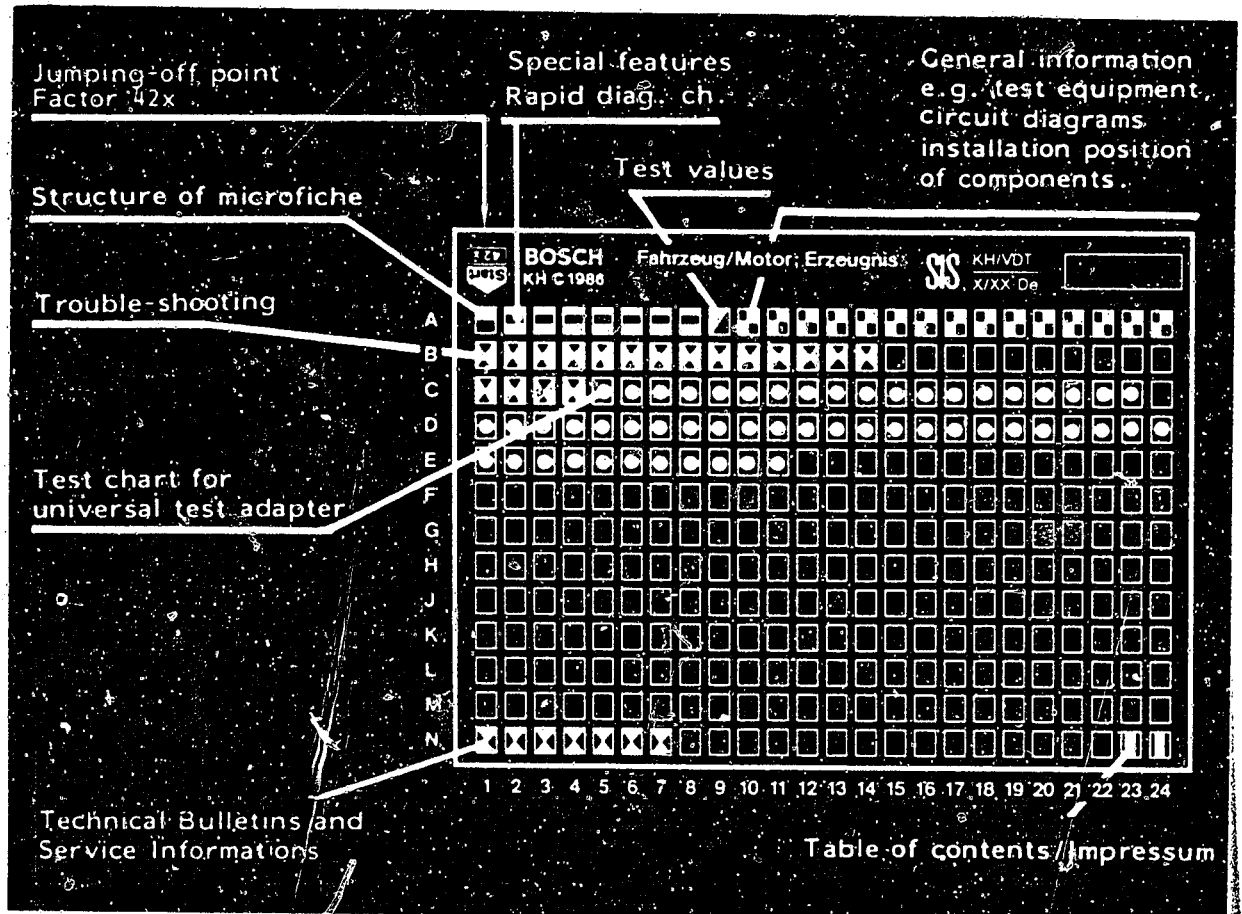


Structure of microfiche



1. Read from left to right
2. Title of microfiche (appears on each coordinate)

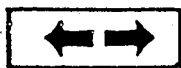
E16	Product/component/test step
	Vehicle/engine

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C6

C6

A1	Trouble-shooting program	
-----------	--------------------------	--

1. Special features

BMW motorcycle K75 as of model year 1985, equipped with distributorless semiconductor ignition system (VZ)

Ignition coil 0 221 125 010

Spark-advance unit 0 227 401 003, .. 605

2. Rapid diagnosis chart for universal test adapter

The following rapid diagnosis chart makes it possible for the experienced specialist to rapidly check the electrical part of the ignition system using the universal test adapter.

The rapid diagnosis chart contains the following information:

- Test-step sequence
- Universal test adapter switch positions
- Remarks on the use of the universal test adapter and other components.
- Motortester test specifications
- Reference to coordinates for detailed trouble-shooting

If detailed information and instructions are necessary, always proceed with trouble-shooting starting with Coordinate B1.

2.1 Prerequisites for testing


Secondary signal (oscilloscope/timing strobe) present. Basic ignition-timing adjustment and high-tension side (high-tension ignition cable, spark-plug connector, spark plug) OK.

Battery fully charged, fuel system OK. Engine in good mechanical order.

Ambient temperature or temperature of ignition system 0° to +100°C (temperature exerts great influence on measured values).



Rapid diagnosis chart for universal test adapter

Test step	Switch position		Remarks	Test specifications (readings)	Trouble-shooting, see coordinates
	V	Ω			
1	1	-	Spark-advance unit not connected Ignition switch and emergency ign. switch "ON", measure voltage	approx. battery voltage	C 12
2	2	-	Ignition switch and emergency ign. switch "ON", measure voltage	approx. battery voltage	C 14
3	3	-	Ignition switch and emergency ign. switch "ON", measure voltage	approx. one-half battery voltage	C 16
4	4	-	Ignition switch and emergency ign. switch "ON", measure voltage	approx. one-half battery voltage	C 18
5	5	-	Ignition switch and emergency ign. switch "ON", measure voltage	approx. one-half battery voltage	C 20
6	6	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, operate starting switch (starting motor does not operate), measure voltage.	approx. battery voltage	C 22
7	7	-	Ignition switch and emergency ign. switch "ON", pull clutch lever operate starting switch (starting motor does not operate), measure voltage.	approx. battery voltage	D 1
8	8	-	Ignition switch "OFF" Connect spark-advance unit Ignition switch and emergency ign. switch "ON", measure voltage	0 V	D 3
9	9	-	Ignition switch and emergency ign. switch "ON", measure voltage	0 V	D 5
10	10	-	Ignition switch and emergency ign. switch "ON", measure voltage	approx. 10 V	D 7
11	12	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Does oscilloscope show rectangular pulse?		D 9

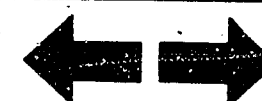
A3

Rapid diagn. chart for univ. test adapt.
BMW motorcycle

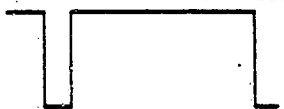
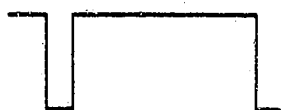





A4

Rapid diagn. chart for univ. test adapt.
BMW motorcycle



Rapid diagnosis chart for universal test adapter

Test step	Switch position		Remarks	Test specifications (readings)	Trouble-shooting, see Coordinate
	V	Ω			
12	13	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Does oscilloscope show rectangular pulse?		D 13
13	14	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Does oscilloscope show rectangular pulse?		D 17
14	15	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Does oscilloscope show rectangular pulse?		D 19
15	15	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, briefly start engine or idle. Press key 3 on universal test adapter (only when engine is running).	After max. 5 sec., approx. one-half battery voltage	D 21
16	16	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Does oscilloscope show primary signal?		D 23
17	16	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Press key 3 on universal test adapter (only when engine is running).	After max. 5 sec., approx. one-half battery voltage	E 1
18	17	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, start or idle engine. Does oscilloscope show primary signal?		E 3
19	17	-	Ignition switch and emergency ign. switch "ON", pull clutch lever, briefly start engine or idle. Press key 3 on universal test adapter (only when engine is running).	After max. 5 sec., approx. one-half battery voltage	E 5

A5

Rapid diagn. chart for univ. test adapt.
BMW motorcycle



A6

Rapid diagn. chart for univ. test adapt.
BMW motorcycle



Rapid diagnosis chart for universal test adapter

Test step	Switch position		Remarks	Test specifications (readings)	Trouble-shooting, see Coordinate
	V	Ω			
20	7	-	Pull ignition trigger unit plug, ignition switch and emergency ign. switch "ON", pull clutch lever, operate starting switch, measure voltage.	< 2 V	E 7
21	2	-	Pull ignition trigger unit plug, ignition switch and emergency ign. switch "ON", pull clutch lever, operate starting switch, measure voltage.	< 2 V	E 9

3. Test specifications

Basic ignition-timing adjustment
at 900 ... 1000 min⁻¹ 5 ... 7°BTDC
USA 3 ... 5°BTDC

B9

Primary ignition coil 0.6 ... 1.1 Ω
Secondary ignition coil 7.7 ... 13.7 kΩ

B11

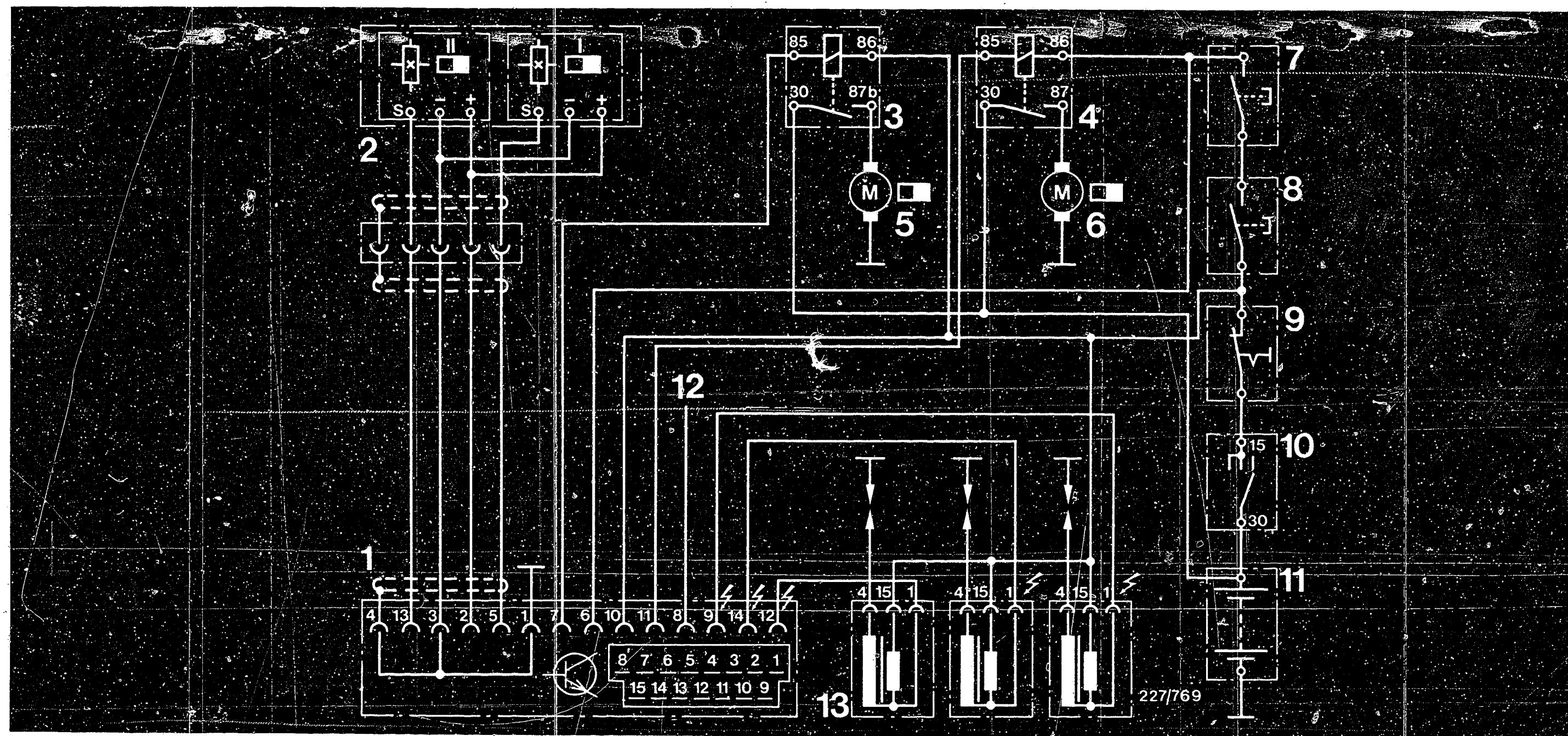
Valve play (cold engine
max. +35°C)
Intake valve 0.15 mm ... 0.20 mm
Exhaust valve 0.25 mm ... 0.30 mm

Engine idle speed 900 ... 1000 min⁻¹

A9

Test specifications
BMW motorcycle





⚡ = dangerous voltages (400 V - 25 kV)

4. Electrical terminal diagram

- | | | | |
|------------------------------|------------------------------|-------------------------------|----------------------------|
| 1 = Timing advance unit | 4 = Starting interlock relay | 8 = Clutch switch | 12 = tn pulse, LE-Jetronic |
| 2 = Ignition trigger unit | 5 = Electric fuel pump | 9 = Emergency ignition switch | 13 = Ignition coils |
| 3 = Electric fuel pump relay | 6 = Starting motor | 10 = Ignition switch | |
| 7 = Starting switch | | 11 = Battery | |

A10

Electrical terminal diagram
BMW motorcycle



A11

Electrical terminal diagram
BMW motorcycle



5. Installation position of components

The spark-advance unit is located in the forward frame section. See arrow, upper illustration. For testing or removing and installing the spark-advance unit, the battery cover, radiator cover, and fuel tank respectively must be partly removed.

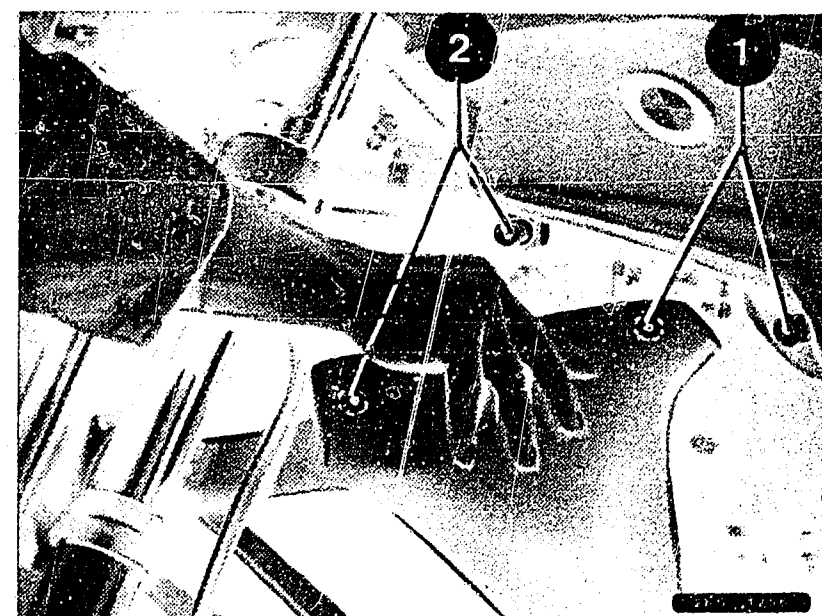
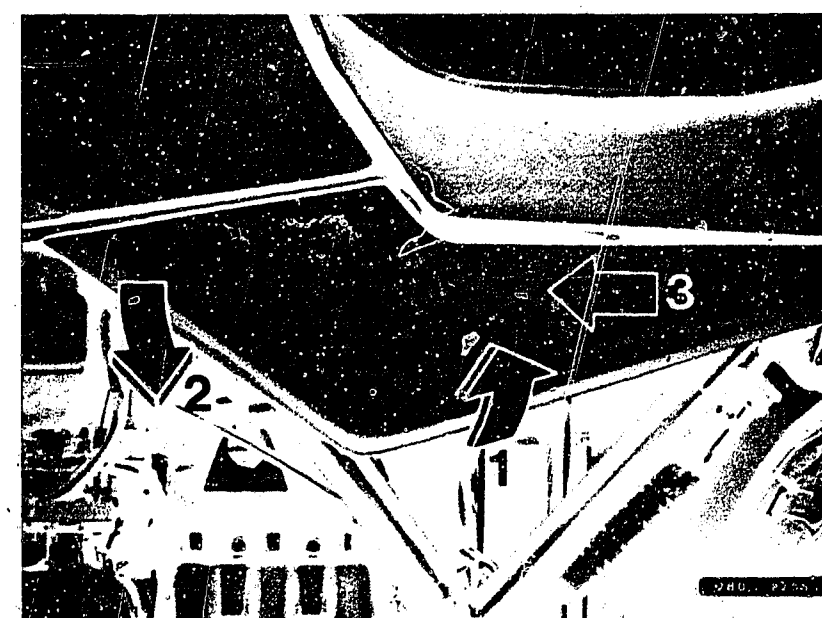
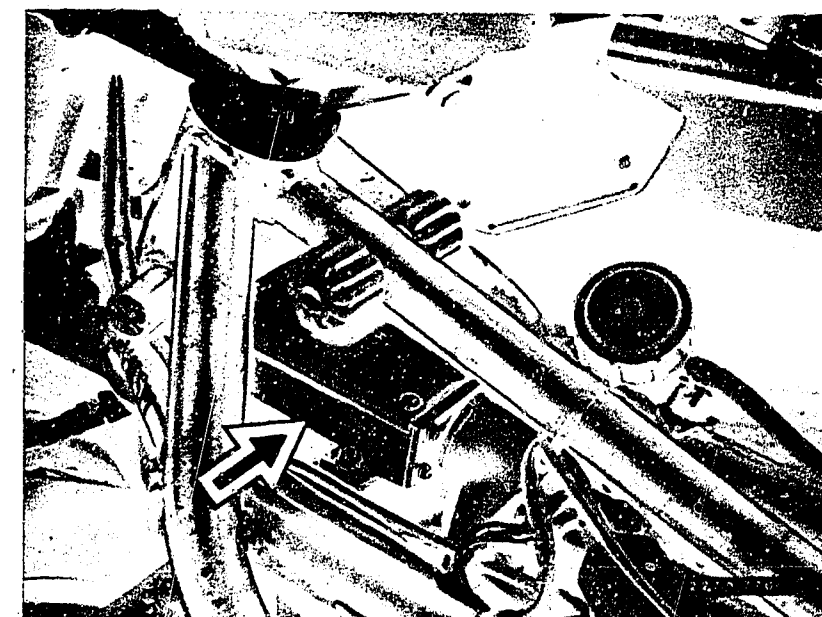
Instructions for removing battery cover (see center illustration)

(1) Carefully pull battery cover down from frame, (2) press downwards out of fastening (on fuel tank), (3) then pull forwards and remove.

Instructions for removing radiator cover (see lower illustration)

Pull left and right radiator covers out of rubber bushings on fuel tank (1). Pull entire radiator covers (complete with side pieces) forward and out of left and right rubber bushings (2), and remove downwards/to the side.

Continued on A14/A15



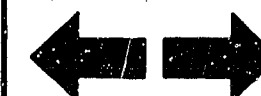
A12

Installation position of components
BMW motorcycle



A13

Installation position of components
BMW motorcycle

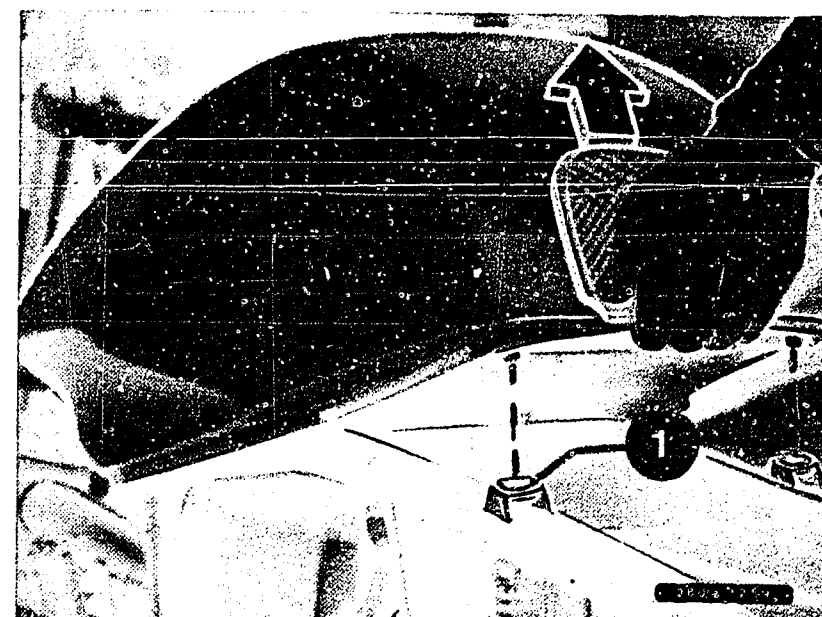
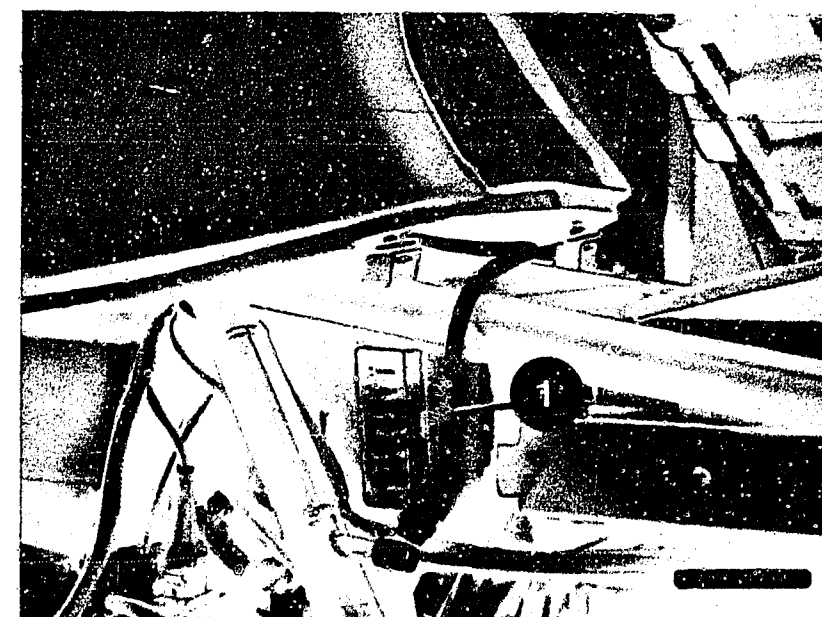
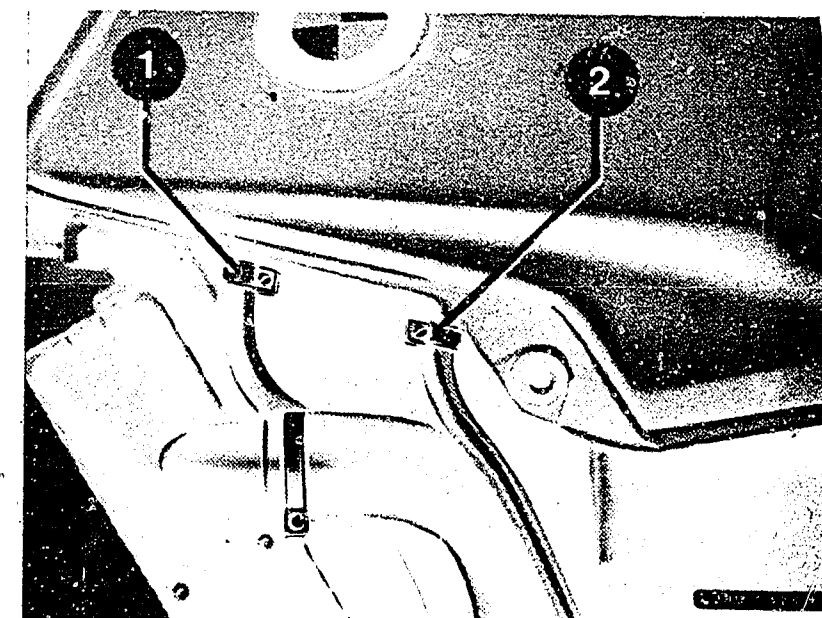


Instructions for removal (continued)

Position rags underneath hose clamps (upper illustration, 1 and 2) to soak up leaking fuel. Loosen hose clamps, pull fuel hoses from fittings.

Pull electrical plug connection (center illustration, 1) from fuel-level sensor.

Pull fuel tank in direction of arrow out of the two rubber bushings (lower illustration, 1), and pull off up and towards the rear.



A14

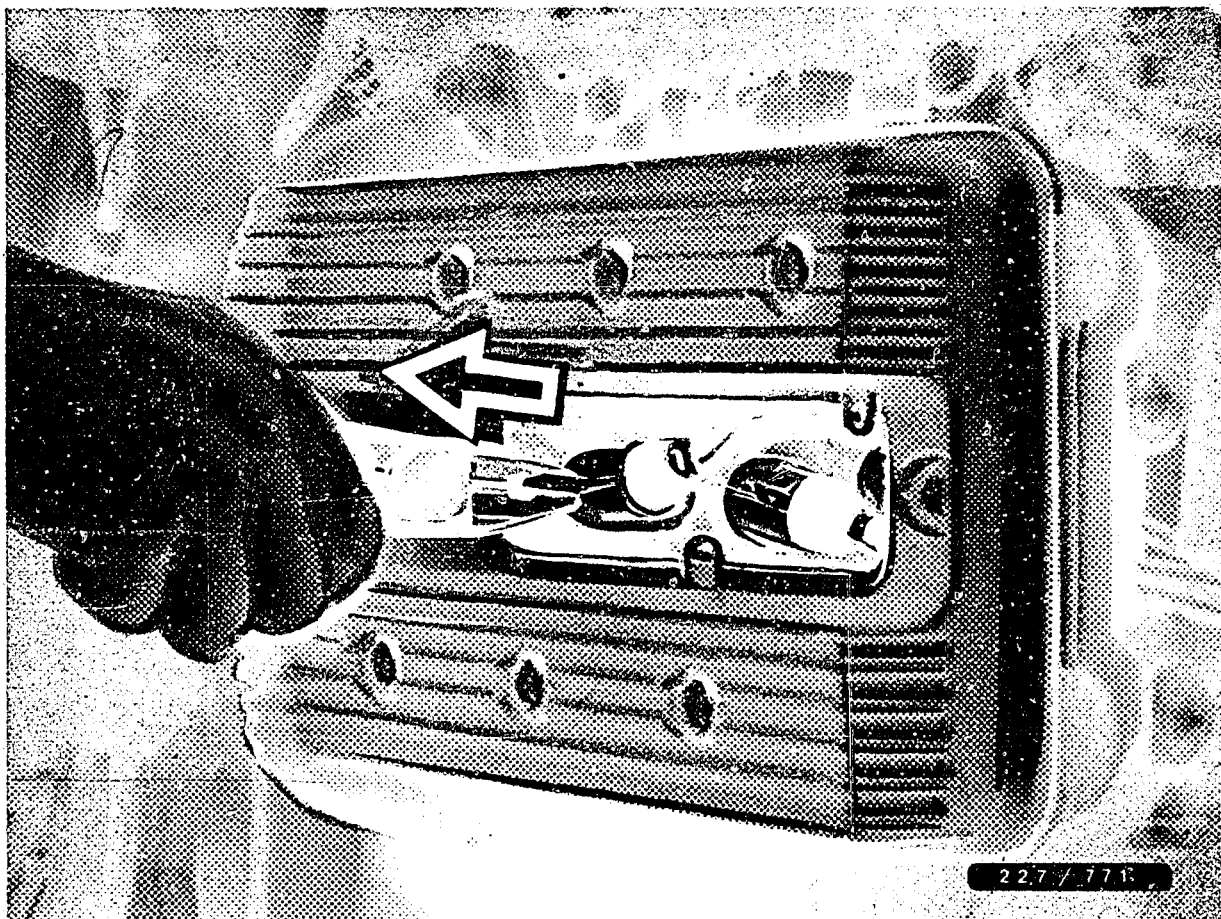
Installation position of components
BMW motorcycle



A15

Installation position of components
BMW motorcycle





The spark plugs are on the left-hand side in the forward direction of travel under the spark-plug cover. See picture.

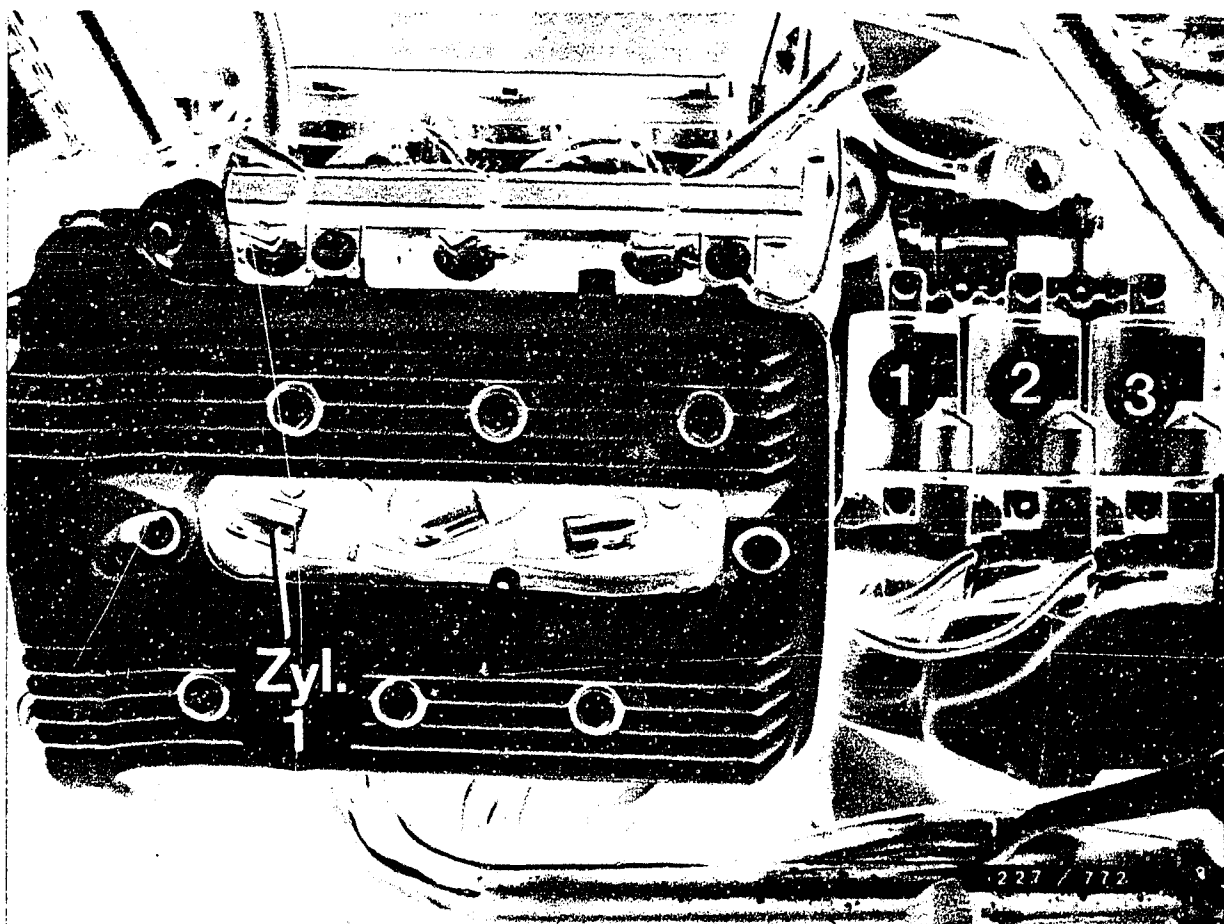
Note on removal:

Unscrew spark-plug cover (not shown).

Pull off shielded spark-plug connectors using combination pliers (connect again later in the same manner) See picture.

Unscrew spark plug using the socket wrench combination (vehicle tools under seat bench).



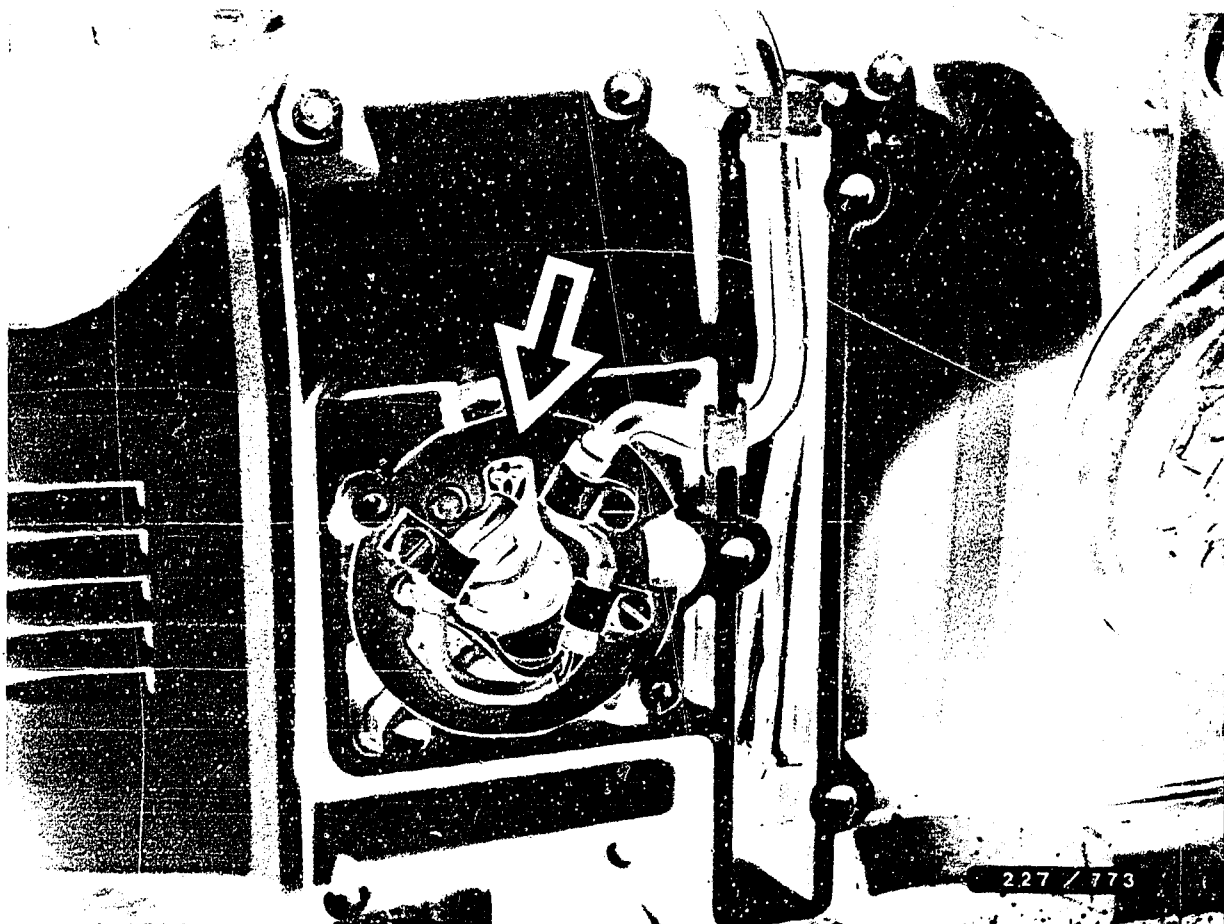


- 1 = Ignition coil for cyl. 1
- 2 = Ignition coil for cyl. 2
- 3 = Ignition coil for cyl. 3

Instructions for removal:

Remove ignition coil cover (not illustrated).



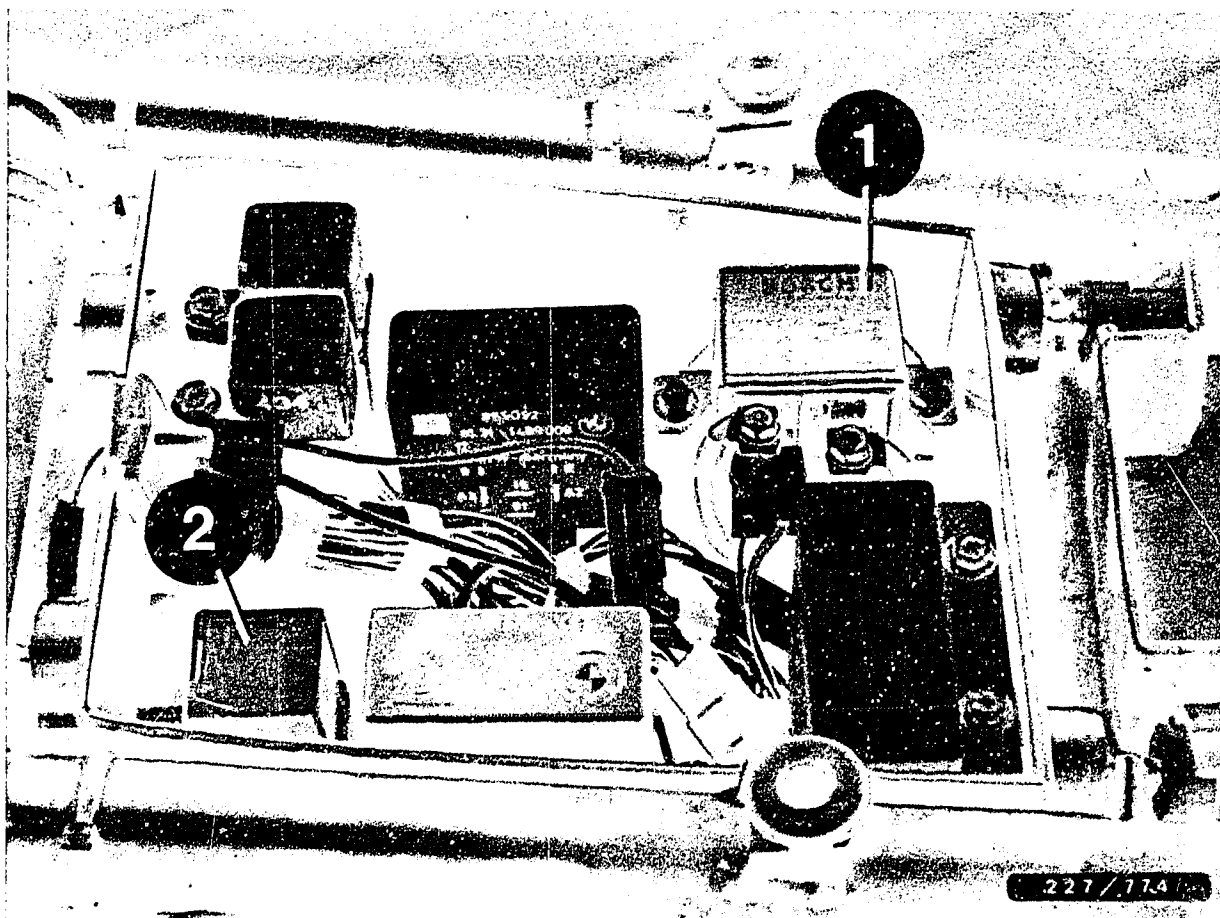


The ignition trigger units are on the engine block at the front (see picture).

Note on removal:

Unscrew protective cover (not shown).





- 1 = Starting interlock relay
- 2 = Electric fuel pump relay

The starting interlock relay and the electric fuel pump relay are in the central-electrics console (see picture).

Note on removal:

Remove battery cover, radiator cover, fuel tank (as previously described).

Remove cover plate from central electrics console (not illustrated).



6. Required test equipment and aids

Motortester	KTE 200*	0 684 400 200
Motortester	KTE 300*	0 684 000 300
Motortester	KTE 301*	0 684 000 301
Motortester	KTE 400*	0 684 000 400
Ohmmeter, e.g.	ETE 014.00	0 684 101 400
Universal test adapter	ETT 018.01	0 684 101 801
Adapter lead		1 684 463 139
Test prod, black		1 684 485 034
Test prod, red		1 684 485 035
(for correctly connecting test equipment and plug connectors)		
Test leads	KDZS 004,	
(for correctly connecting	.. 005	
test equipment to plug connectors)		

* Only the motortesters listed may be used for engine speed and rectangular pulse testing (on-off ratio) and timing testing.



7. Danger of accident on electronic ignition systems

Increased demands of modern engines on the ignition system combined with the desire for freedom of maintenance have recently led to electronic ignition systems being fitted as standard. Usually the ignition power of electronic systems (of almost all manufacturers) is higher than that of conventional systems, and there are signs of further increases in power. Electronic ignition systems thus reach a power range which can be highly dangerous if live parts or terminals are touched (both on the primary as well as the secondary sides).

In this connection we should like to point out that the VDE regulations, in particular VDE 0104/7.67 and/or the respective national regulations must be followed when testing or working on the ignition system.

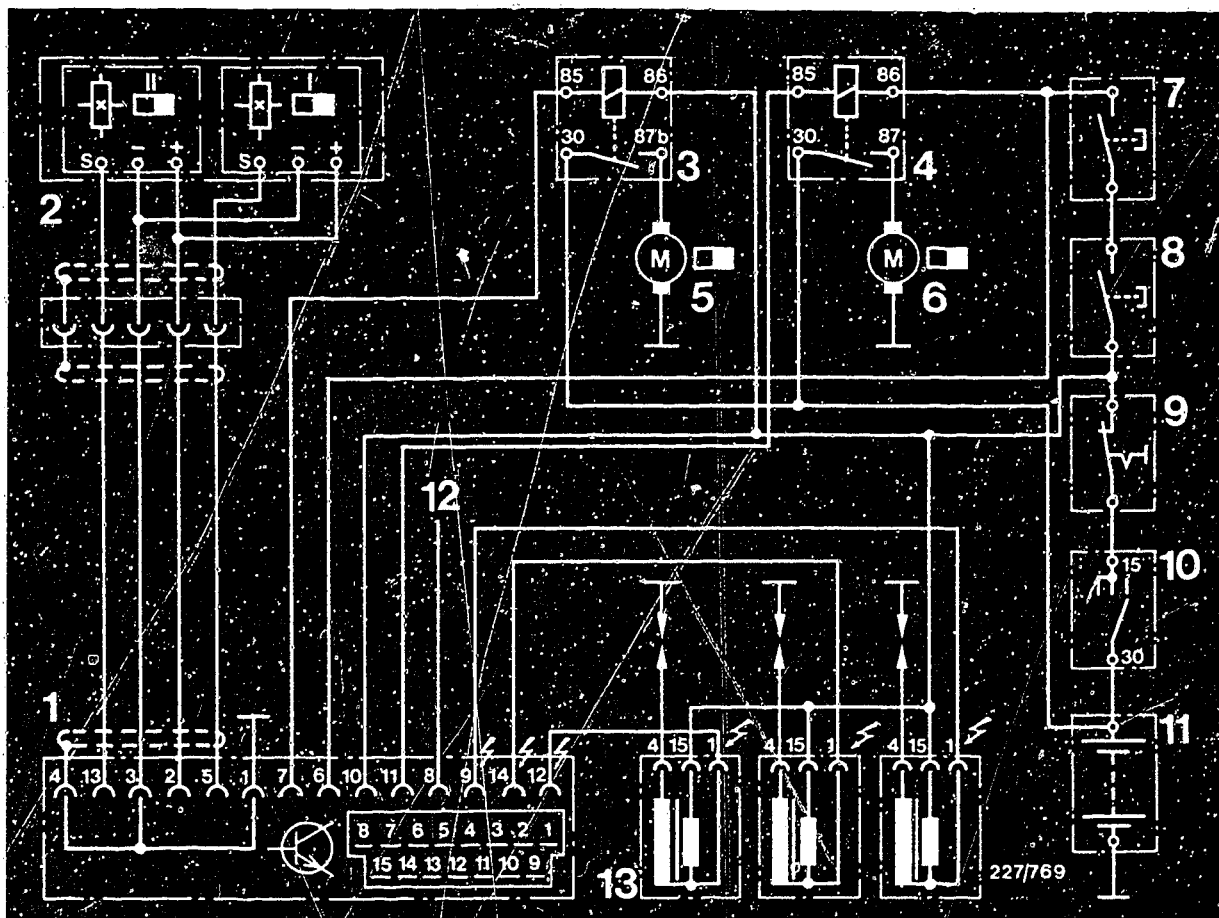
The ignition should always be switched off when working on the ignition system (switch off ignition or voltage source). Such work includes:

- Connecting of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope, etc.).
- Replacing parts of the ignition system (spark plug, ignition coil, ignition distributor, H.T. ignition cable, etc.).

If, when testing the ignition system or when performing adjustment work on the engine (e.g. LE-Jetronic), it becomes necessary to switch on the ignition (ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accidents exists, therefore, not only on the individual components of the ignition system (e.g. ignition coil, timing advance unit, ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and on test equipment.





- | | |
|------------------------------|-------------------------------|
| 1 = Timing advance unit | 9 = Emergency ignition switch |
| 2 = Ignition trigger unit | 10 = Ignition switch |
| 3 = Electric fuel pump relay | 11 = Battery |
| 4 = Starting interlock relay | 12 = In pulse, LE-Jetronic |
| 5 = Electric fuel pump | 13 = Ignition coil |
| 6 = Starting motor | |
| 7 = Starting switch | |
| 8 = Clutch switch | |

⚡ = dangerous voltages (400 V - 25 kV)

Electrical terminal diagram

The dangerous locations are identified by danger arrows taking the example of the terminal diagram of an electronic ignition system.



8. Important vehicle information

- Only perform resistance measurements with the ignition off or with the battery disconnected (measuring instrument defective).
- For compression testing, pull ignition coil plug terms. 1 and 15 (hazardous high voltage, damage to insulation on ignition coil and harness).
When connecting, do not mix up ignition coil plugs.
- To prevent the timing advance unit from being irreparably damaged, the secondary side (respective H.T. ignition cable including spark-plug connector) of the ignition system must have at least 2 k Ω interference suppression.
- No external voltage, e. g. ohmmeter, may be connected to ignition trigger units (Hall generators).
Caution when changing over measuring ranges.
- Do not disconnect battery with engine running.
- Incorrect polarity of battery will destroy timing advance unit.
- Do not use a starting aid with more than 16 V or a fast charger for starting.



- The specified ignition coil (see Part No.) must not be replaced by a different ignition coil.
- No suppression capacitor must be connected to ignition coil term.1.
- Ignition coil term.1 must not be brought into contact with ground as a theft-proofing measure (with "ignition on" ignition coil will be destroyed).
- No battery + and test lamp must be connected to ignition coil term.1 (timing advance unit will be destroyed).
- There must be no arcing between ignition coil term.4 and ignition coil term.1 and term.15.
Ignition trigger units and timing advance unit may be destroyed.
- H.T. ignition cables on ignition coil term.4 including spark-plug connectors must not be disconnected during operation.



9. Trouble-shooting

9.1 How to use the trouble-shooting chart

The trouble-shooting chart beginning on Coordinate B3 contains fault symptoms, cause of trouble, test instructions and coordinate references. Select the possible cause of the trouble in the trouble-shooting chart according to the customer complaint (fault symptom).

If the cause of the trouble is unclear start testing with the detailed self-contained trouble-shooting program or the following test chart starting on Coordinate B7.

If the cause of the trouble has been clearly detected according to the trouble-shooting chart then direct trouble-shooting is possible within the trouble-shooting program by way of the coordinate reference without the entire trouble-shooting program having to be performed for each fault.

If there is no coordinate reference, carry out the trouble-shooting according to the "test instructions" column.

9.2 How to use the trouble-shooting program

Since test steps, such as ignition timing, spark plug test etc., cannot be performed with the universal test adaptor, the detailed trouble-shooting program is divided into a "trouble-shooting program" and a "test chart".

If the fault is not found with the trouble-shooting program, continue trouble-shooting with the test chart.

The trouble-shooting program starting on Coordinate B7 is divided into 3 rows of boxes.

The left-hand row contains test instructions and test specifications.

The centre row contains repair instructions.

The right-hand row contains the illustrations/terminal diagrams belonging to the text and explains the items in the illustrations/diagrams.

If the questions in the left-hand row can be conclusively answered with "yes", proceed to the next test down.

If the answer to the question is "no", branch to the centre row and carry out the tests given there.

9.2.1 Using the test chart

Connect universal test adapter as per Coordinate C5 and carry out all test steps per test chart.

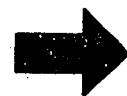
9.3 Before testing, make sure of the following:

Battery fully charged, fuel system O.K., engine mechanically O.K. (e.g. compression, valve clearance etc.), ambient temperature/ignition system temperature 0° to 100°C (temperature has a considerable effect on measured values).

B1

Trouble-shooting

BMW motorcycle

**B2**

Trouble-shooting

BMW motorcycle



10. Trouble-shooting chart
Customer complaint (fault symptom)

1. Starting motor operates
2. Starting motor operates, but engine fails to start
3. Rough idling
4. Poor throttle response
5. Engine lacks power
6. Misfiring
7. Fuel consumption too high
8. Engine pings when accelerating
9. Backfiring
10. Engine becomes too hot

											<u>Cause of fault</u>	<u>Test instructions</u>	<u>Coordinate</u>
•	•	•	•	•	•	•	•	•	•	•	Not cleat	Perform detailed trouble-shooting	B 7
	•	•	•	•	•	•		•			Spark plugs defective	Assess using ignition oscillogram or remove spark plug and make visual examination.	-----
	•		•	•		•	•			•	Basic ignition timing incorrect	-----	B 9
	•	•	•	•	•						Shunt on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram or make visual examination.	-----
	•	•	•	•	•						Open circuit on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram, or test for continuity using ohm-meter.	B 11
	•										Open circuit on primary side	-----	B 11
	•	•	•	•	•						Ignition coil defective	-----	B 11

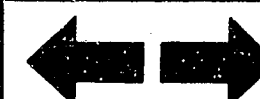
B3

Trouble-shooting chart
BMW motorcycle



B4

Trouble-shooting chart
BMW motorcycle



Trouble-shooting chart
Customer complaint (fault symptom)

1. Starting motor operates
2. Starting motor operates, but engine fails to start
3. Rough idling
4. Poor throttle response
5. Engine lacks power
6. Misfiring
7. Fuel consumption too high
8. Engine pings when accelerating
9. Backfiring
10. Engine becomes too hot

											<u>Cause of fault</u>	<u>Test instructions</u>	<u>Coordinate</u>
			●	●	●						Interference-suppression resistors defective	Assess using ignition oscillogram, or test for continuity using ohmmeter	---
	●										Ignition trigger units defective		C 5
●	●										Timing advance unit defective		C 5
●											Starting interlock relay contact 30/87 or starting motor defective	Test operation of starting interlock relay or starting motor	---
	●							●			Firing sequence incorrect	Firing sequence 3-1-2	---

B5

Trouble-shooting chart
 BMW motorcycle



B6

Trouble-shooting chart
 BMW motorcycle



11. Trouble-shooting program

Test secondary signal.

Secondary signal testing with oscilloscope

Remove ignition coil covers. Connect oscilloscope per operating instructions to ignition coils for cylinders 1, 2, and 3 one after the other. See illustration.

Start engine.

Oscilloscope must show a secondary signal (of any value).

Secondary signal testing with timing light

Connect timing light to ignit. coil of cyl.1,2 and 3 one after the other according to operating instructions.

See illustration.

Start engine.

Timing light must flash.

Secondary signal present or timing light flashing?

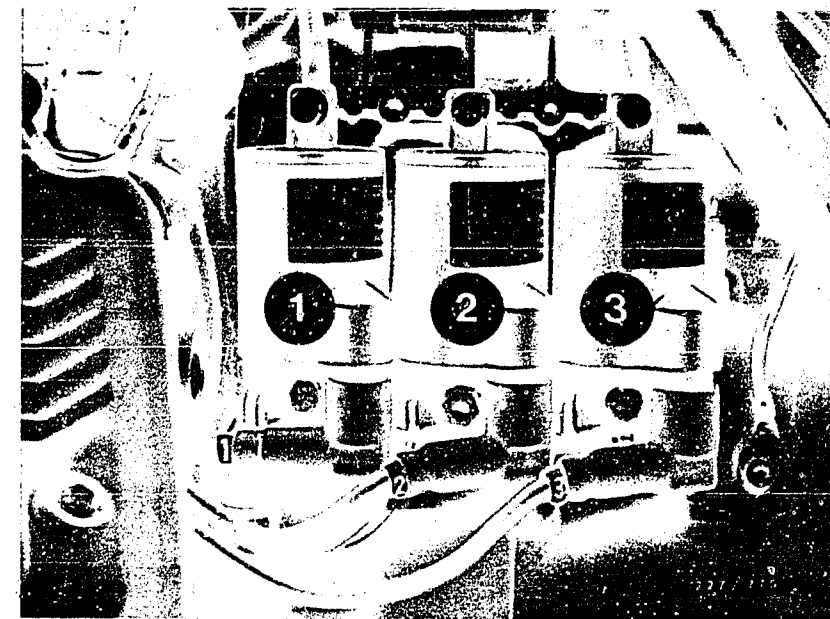
No

If no secondary signal or timing light not flashing, then continue testing at C1.

Tests from B9 onward not necessary.

Yes

Continued on B9/B10



- 1 = Ignition coil, cyl. 1
- 2 = Ignition coil, cyl. 2
- 3 = Ignition coil, cyl. 3

B7

Trouble-shooting program

BMW motorcycle



B8

Trouble-shooting program

BMW motorcycle



yes

Check basic ignition-timing adjustment. Remove protective cover on engine block. See lower illustration. Connect motortester per operating instructions. Clamp-on induction pickups at cyl. 3. Set motortester to two-stroke engine or Wankel engine.

Testing:

Start engine and run at 900 ... 1000 min⁻¹. Basic ignition-timing adjustment must be $6 \pm 1^\circ$ or USA $4 \pm 1^\circ$ BTDC.

Or:

If engine stalls, run engine at starting speed. Basic ignition-timing adjustment must be $6 \pm 1^\circ$ or USA $4 \pm 1^\circ$ BTDC.

Note:

Since there is no $6^\circ / 4^\circ$ BTDC marking, basic ignition-timing adjustment is ascertained via BTDC marking.

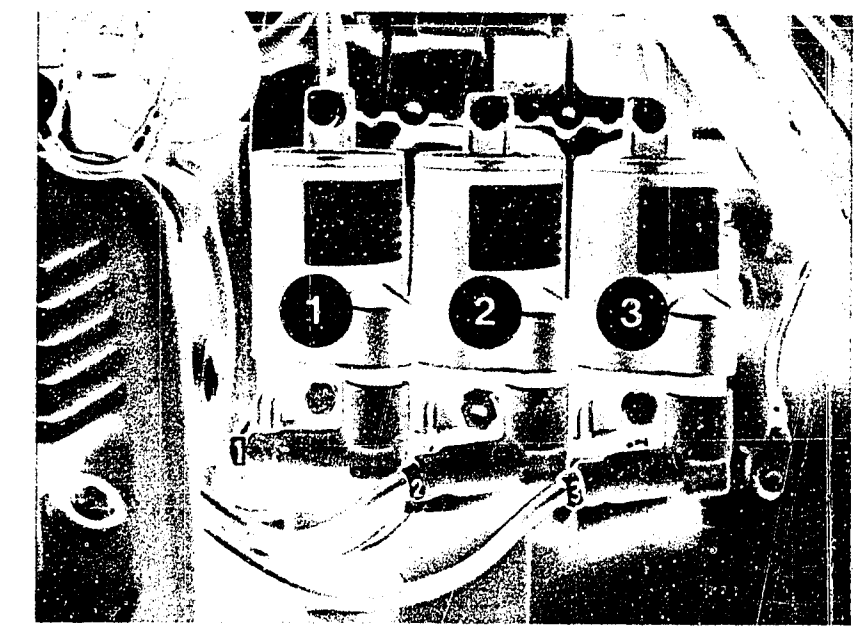
Is basic ignition-timing adjustment OK?

no

Loosen ignition trigger unit fastener (see arrow, upper illustration) and turn ignition trigger unit to attain $6 \pm 1^\circ / 4 \pm 1^\circ$ BTDC

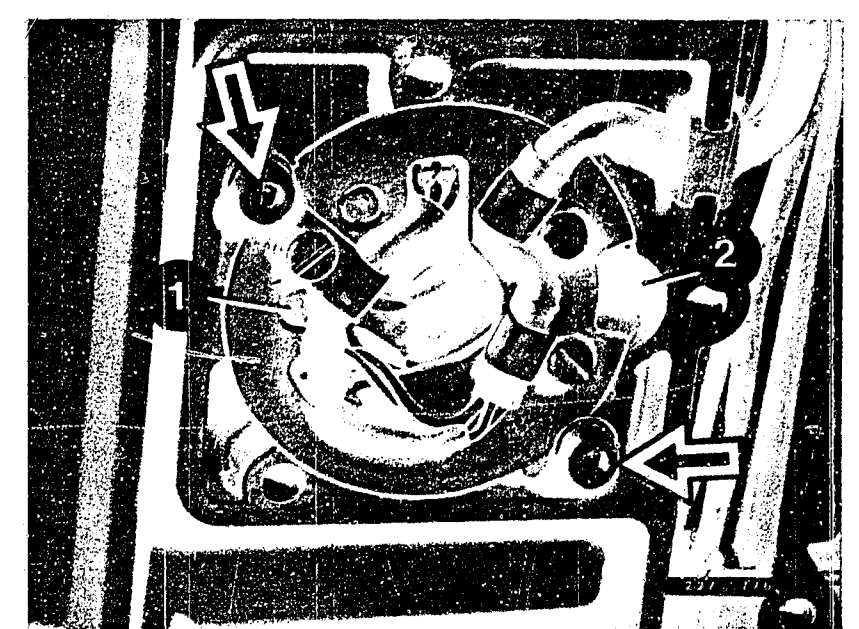
yes

Continued on B11/B12



- 1 = Ignition coil, cyl. 1
- 2 = Ignition coil, cyl. 2
- 3 = Ignition coil, cyl. 3

- 1 = Ignition trigger unit
- 2 = Sight hole for timing mark



B9

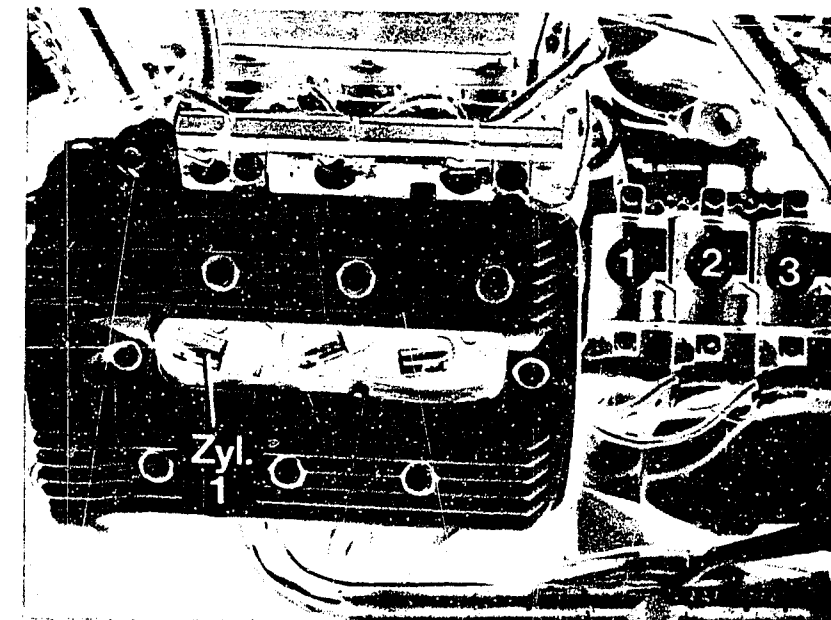
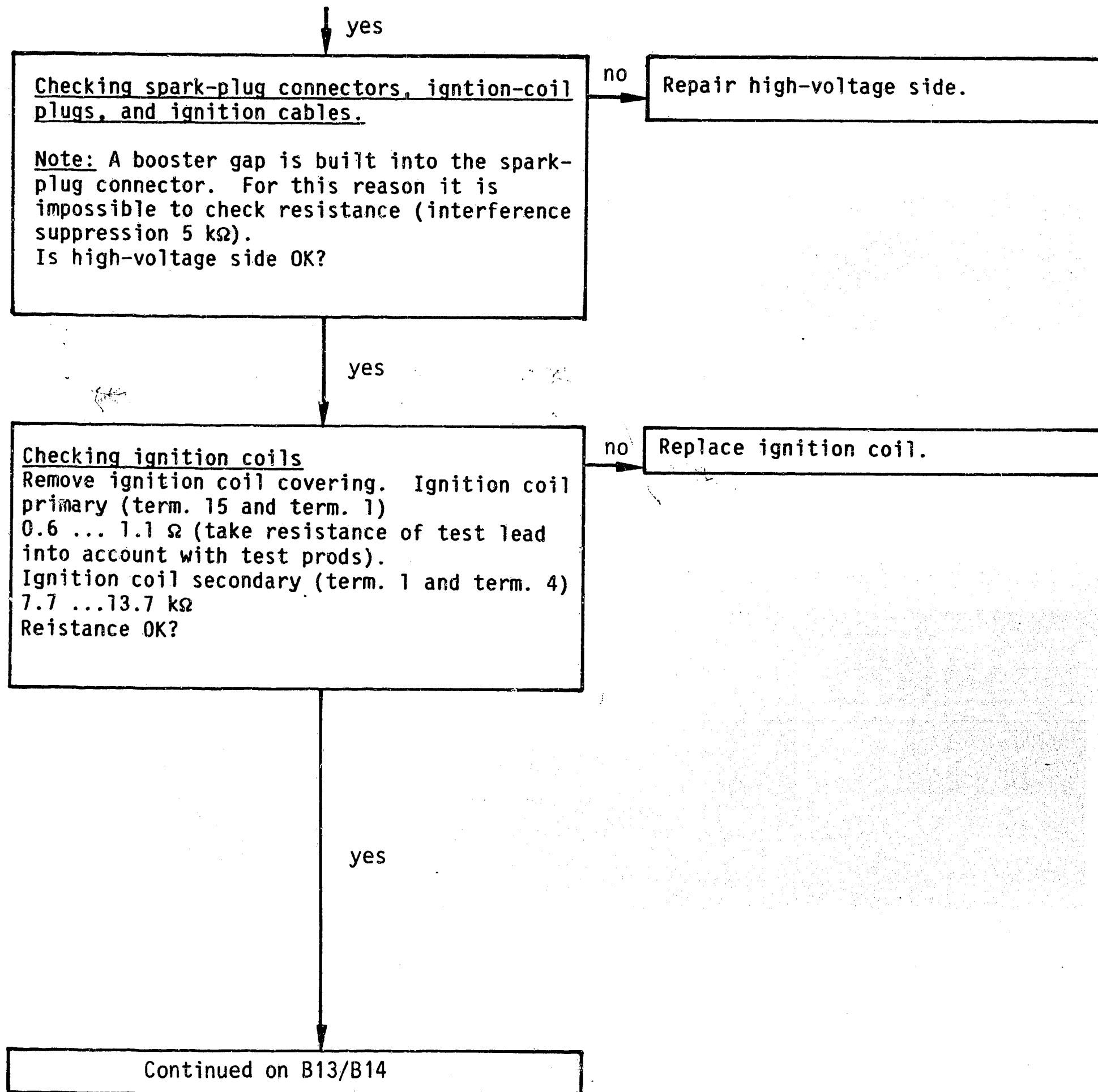
Trouble-shooting program
BMW motorcycle



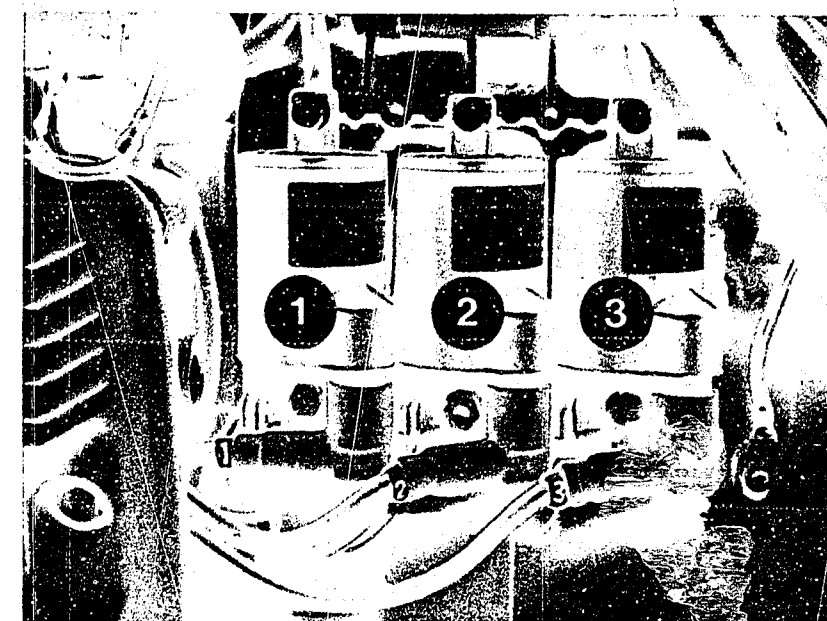
B10

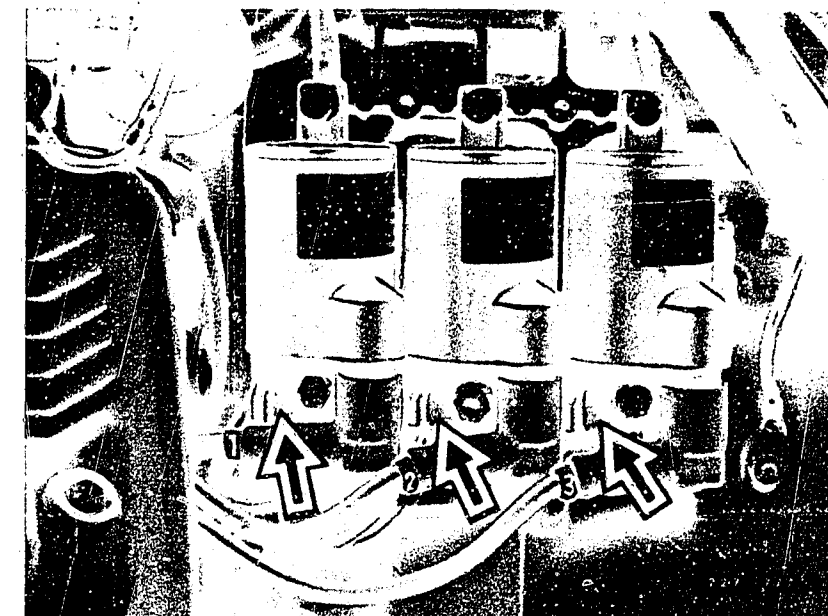
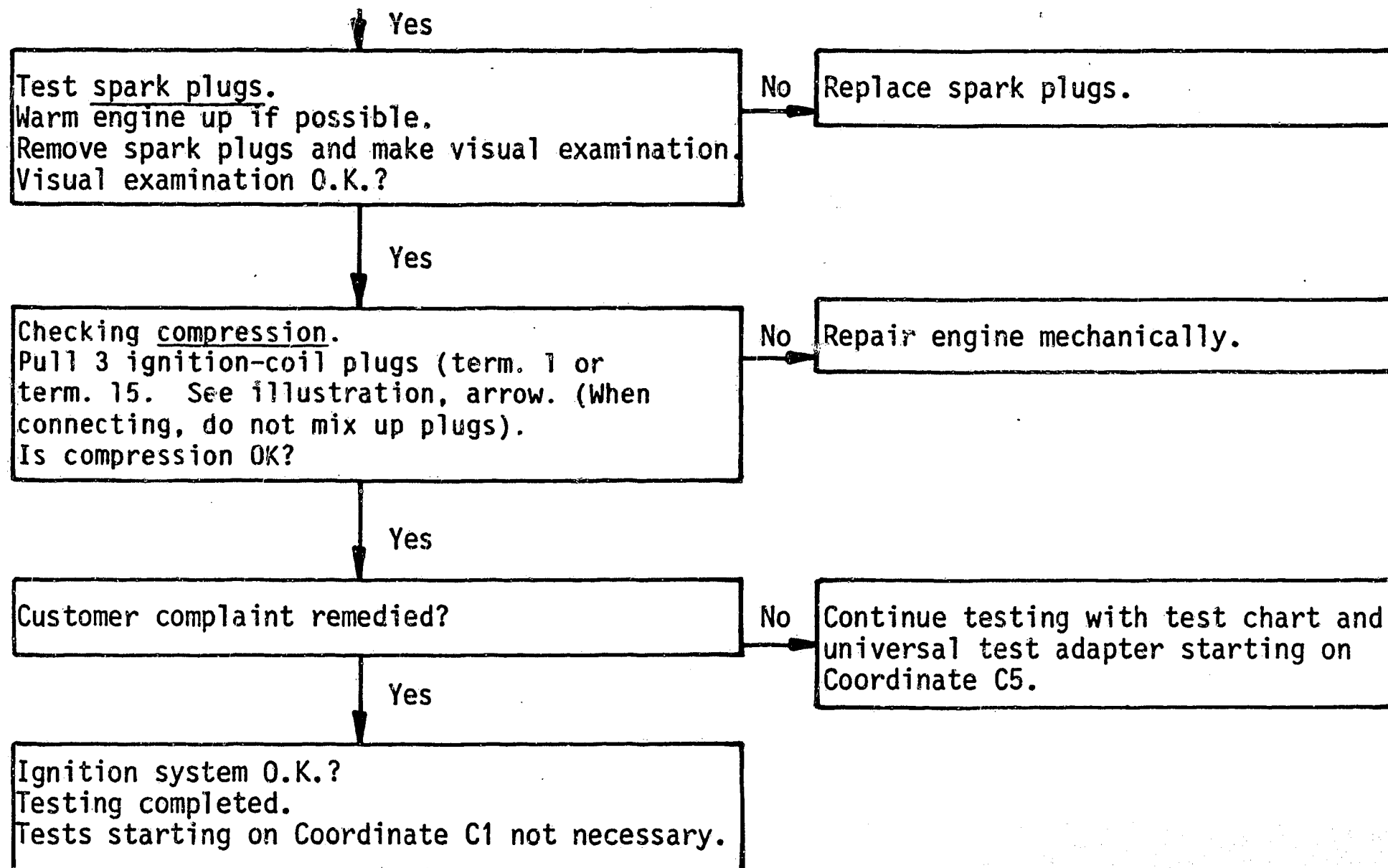
Trouble-shooting program
BMW motorcycle





1 = Ignition coil, cyl. 1
2 = Ignition coil, cyl. 2
3 = Ignition coil, cyl. 3





No secondary signal
Continued from B7/B8

yes

Check spark-plug connectors, ignition-coil
plugs, and ignition cables

Note: A booster gap is built into the spark-
plug connector. It is thus not possible to
test resistance (interference suppression
5 k Ω).
High-voltage side OK?

no

Repair high-voltage side.

yes

Check ignition coil

Remove ignition coil cover.
Ignition coil primary (term. 15 and term. 1)
0.6 ... 1.1 Ω (take resistance of test lead
into account with test prods).
Ignition coil secondary (term. 1 and term. 4)
7.7 ... 13.7 k Ω

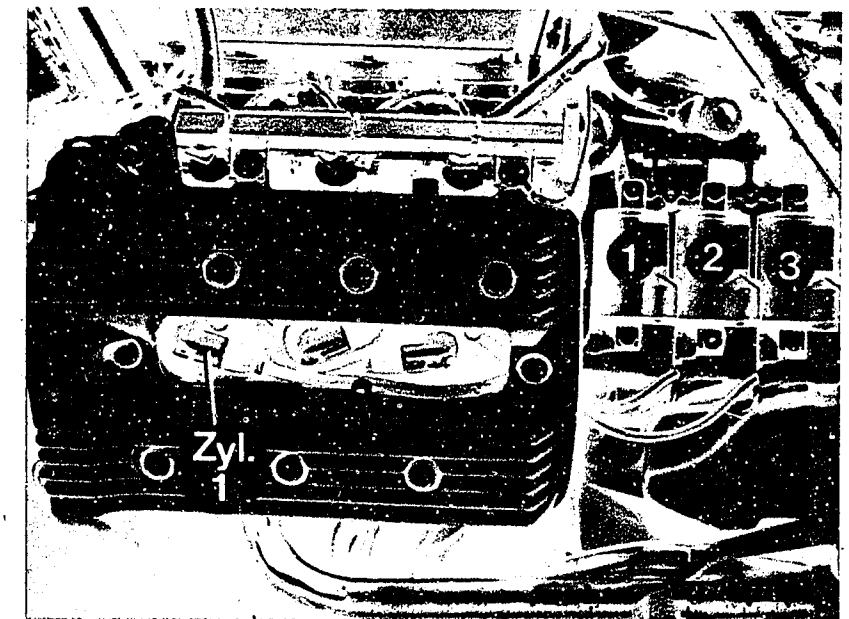
Is resistance OK?

no

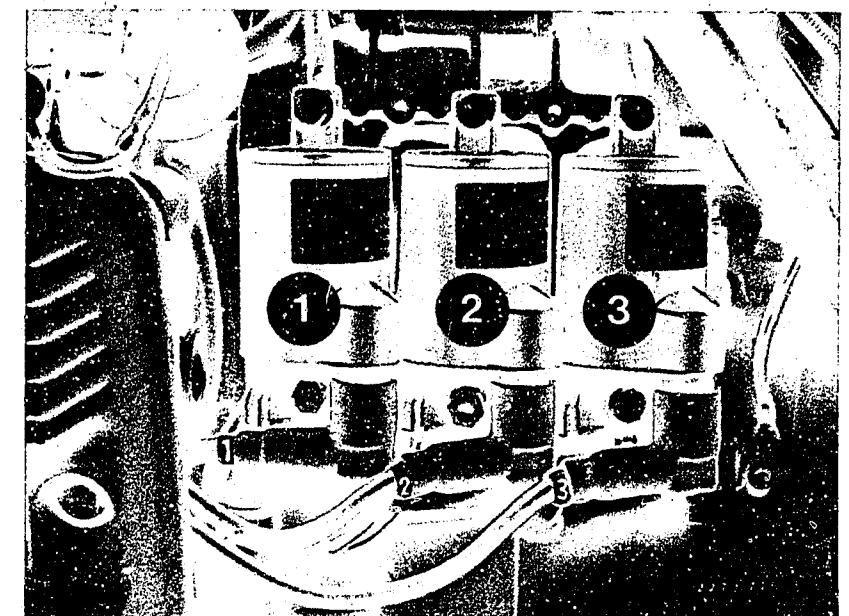
Replace ignition coil.

yes

Continued on C3/C4



1 = Ignition coil, cyl. 1
2 = Ignition coil, cyl. 2
3 = Ignition coil, cyl. 3



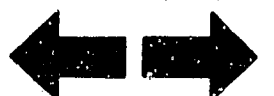
C1

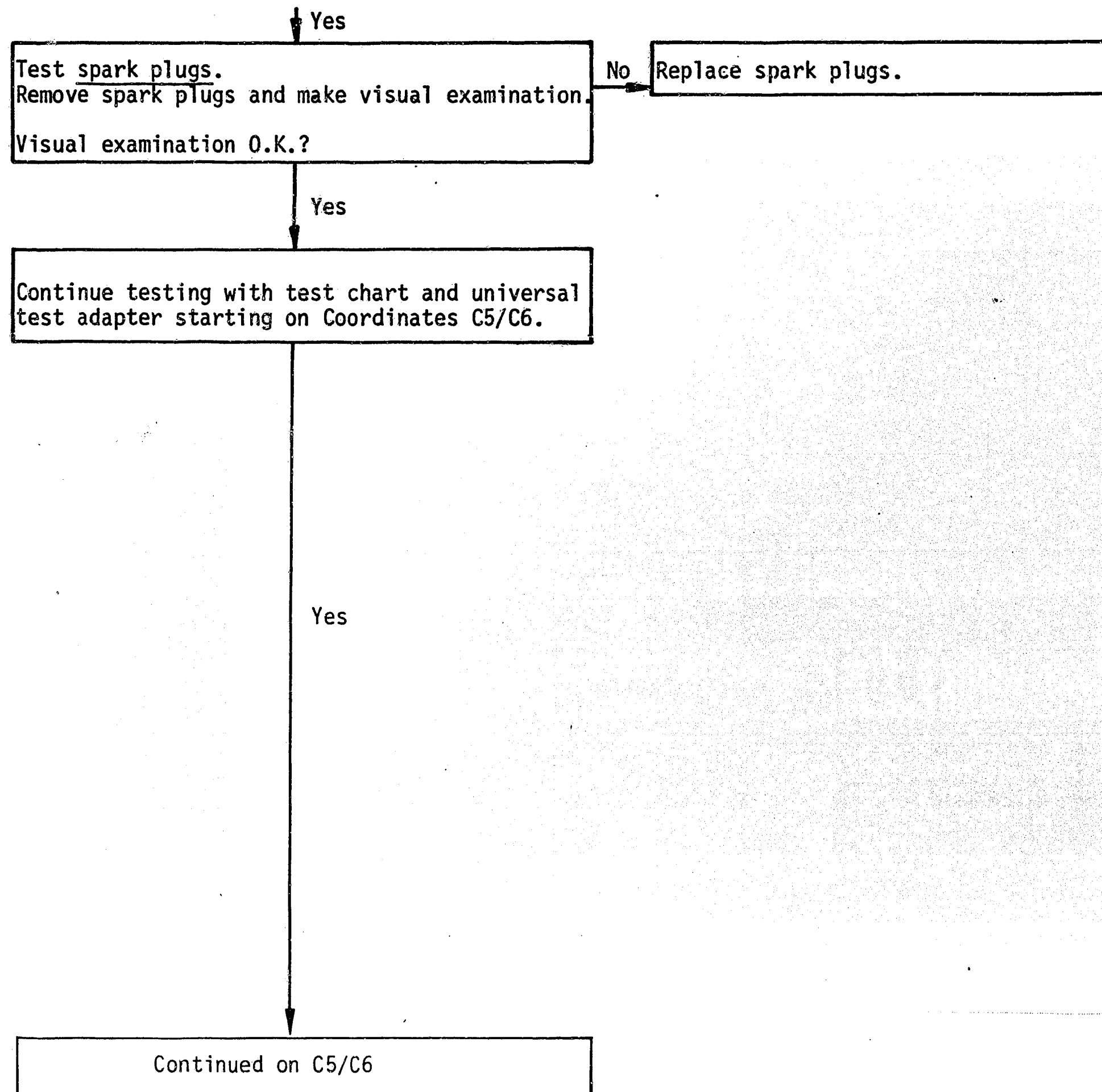
Trouble-shooting program
BMW motorcycle



C2

Trouble-shooting program
BMW motorcycle





C3

Trouble-shooting program
BMW motorcycle



C4

Trouble-shooting program
BMW motorcycle



12. Test chart for universal test adapter (connect universal test adapter)

To connect the universal test adapter, the battery cover, radiator cover, and fuel tank respectively must be partly removed.

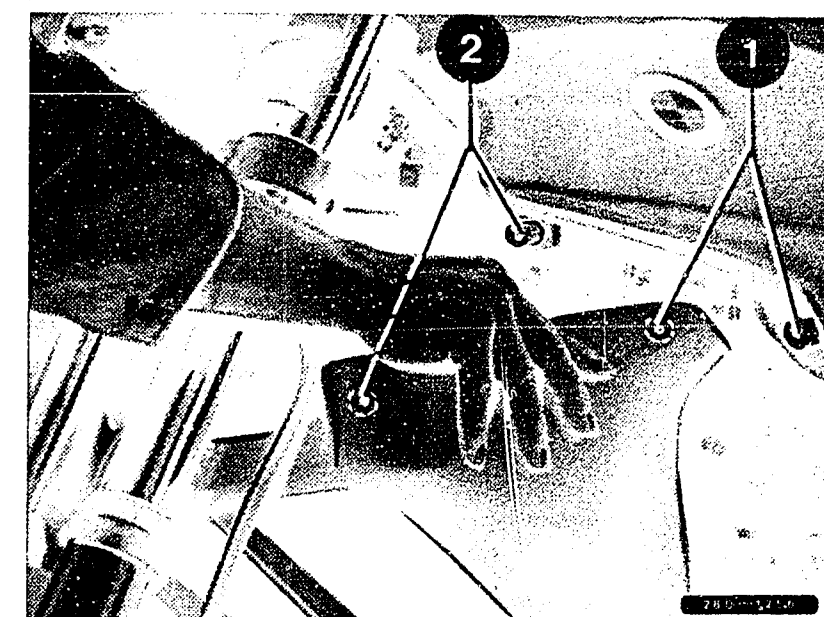
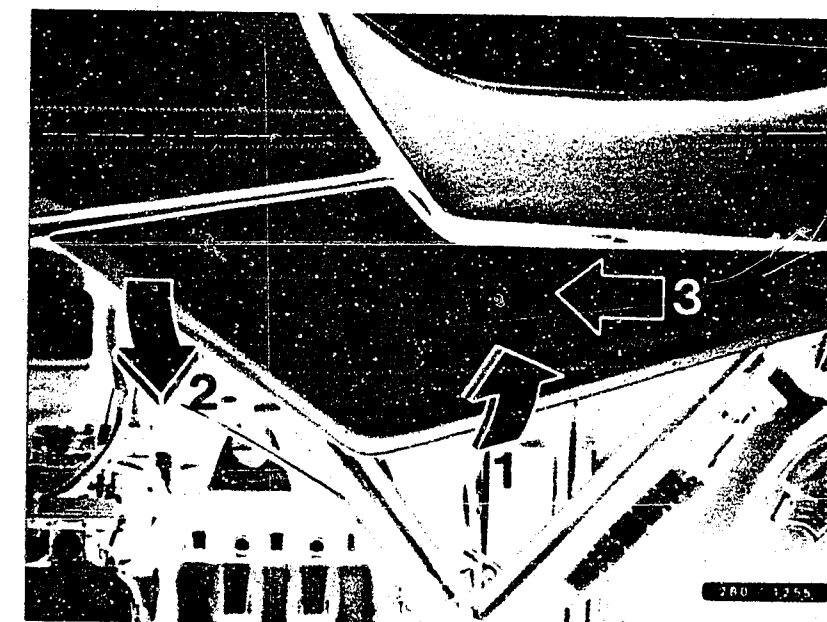
Instructions for removing battery cover (see upper illustration).

(1) Press battery cover downwards out of fastening (on fuel tank) (carefully pull out of lower frame (2)), then pull forwards and remove (3).

Instructions for removing radiator covering (see lower illustration)

Pull left and right radiator coverings out of rubber bushings on fuel tank (1).

Pull entire radiator covering (complete with side pieces) forwards out of rubber bushings on the left and right (2), and pull away downwards and to the side.



Continued on C7/C8

C5

Test chart for universal test adapter
BMW motorcycle



C6

Test chart for universal test adapter
BMW motorcycle



Instructions for removal (continued)

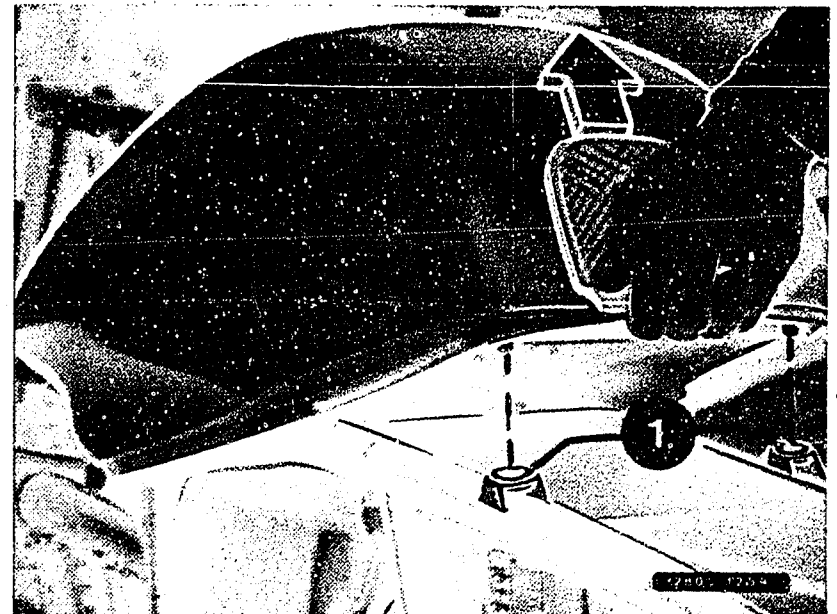
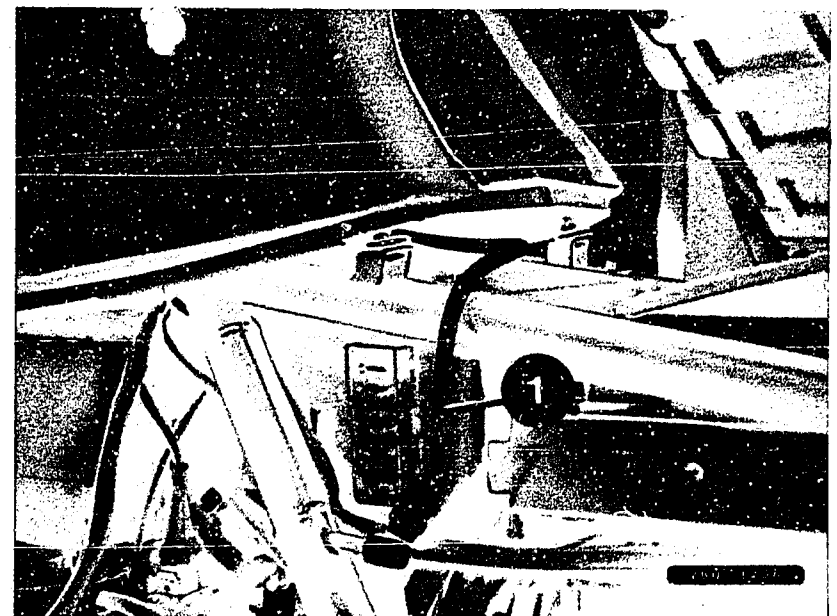
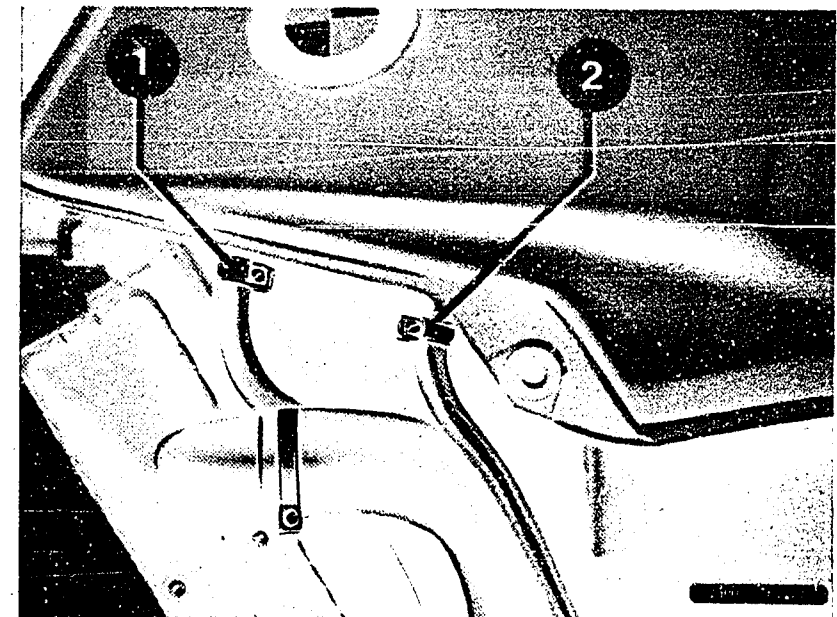
Fuel tank

Position rags underneath hose clamps to soak up leaking fuel (upper illustration 1 and 2).

Loosen hose clamps and remove fuel hoses from fittings.

Pull electric plug connection (center illustration 1) from fuel-level sensor.

Pull fuel tank in direction of arrow upwards out of the two rubber bushings (lower illustration 1) and remove upwards and towards the rear.



C7

Test chart for universal test adapter
BMW motorcycle



C8

Test chart for universal test adapter
BMW motorcycle



Switch off ignition.

Disconnect timing advance unit plug. See arrow, top picture.

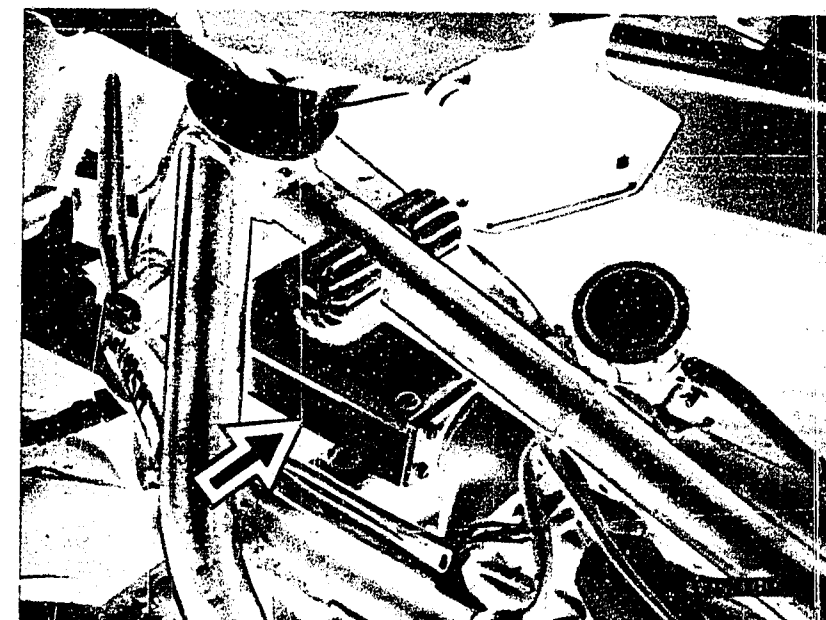
Connect universal test adapter with adapter lead to disconnected timing advance unit plug. See bottom picture.

Note: To test the fully electronic ignition system, first of all only the timing advance unit plug (motorcycle wiring harness) and later the timing advance unit is connected to the universal test adapter. Be sure to follow the instructions in the test chart.

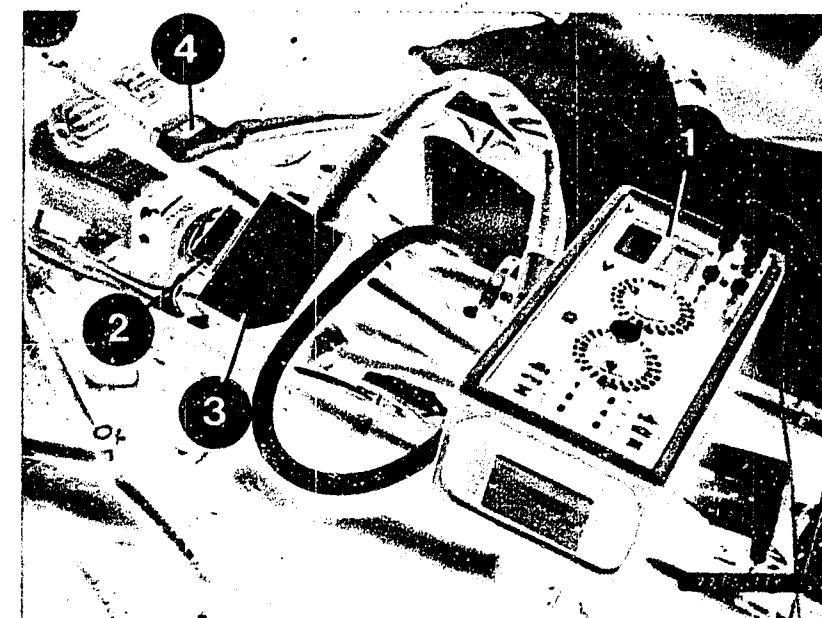
To make the measurements, a measuring instrument for measuring voltage and resistance must be connected to the universal test adapter. For the rectangular pulses (on/off ratio) the motortester must be connected.

The individual test steps are selected with the program switch. The symbols V and Ω tell the operator whether voltage or resistance is being measured.

By pressing the buttons, it is possible with the timing advance unit connected and with the engine running to simulate operating conditions. Thus, for example, by pressing button 3 it is possible to stop the engine.



- 1 = Universal test adapter
- 2 = Timing advance unit plug
- 3 = Connection to timing advance unit plug
- 4 = Connection to timing advance unit



C9

Test chart for universal test adapter

BMW motorcycle

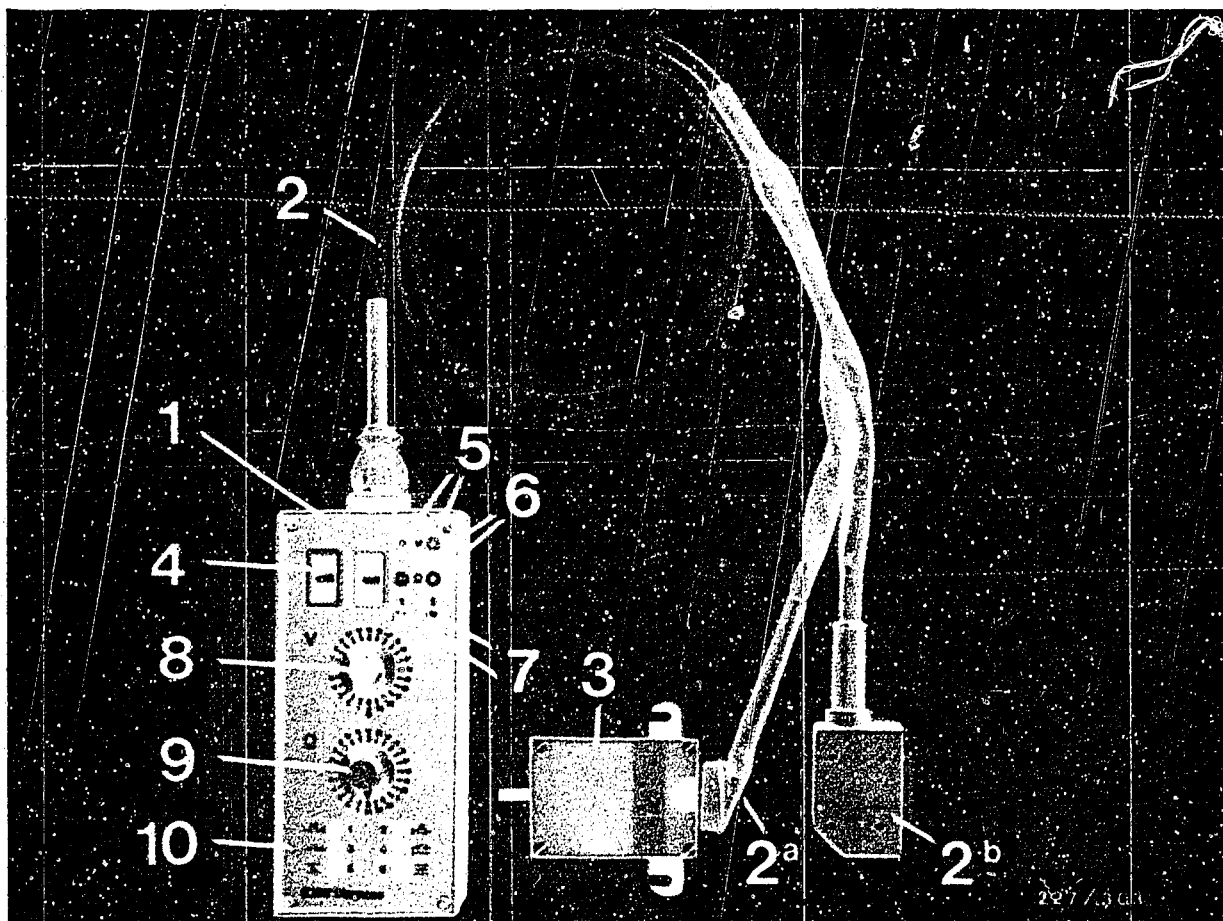


C10

Test chart for universal test adapter

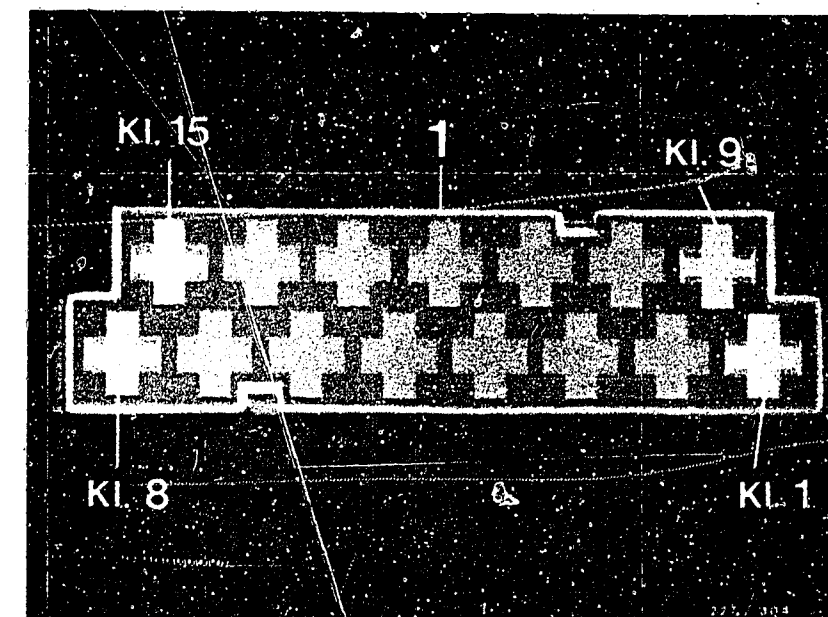
BMW motorcycle





- 1 = Universal test adapter
 - 2 = Adapter lead
 - 2a = Connection to timing advance unit
 - 2b = Connection to motorcycle wiring harness
 - 3 = Timing advance unit
 - 4 = Test wells (for motortester)
 - 5 = Test sockets (for voltage measurement)
 - 6 = Test sockets (for resistance measurement)
 - 7 = Test sockets (for motortester)
 - 8 = Program switch "V"
 - 9 = Program switch " Ω "
 - 10 = Button panel for simulation of operating conditions
- Button 1 =) not occupied
 - Button 2 =) not occupied
 - Button 3 =) stopping engine
 - Button 4 =) not occupied
 - Button 5 =) not occupied
 - Button 6 =) not occupied

Test step 1		
Operation	Reading	Testing
Program switch "V" at position:	1	<u>Component:</u> Battery Ignition switch Emergency ignition switch
Program switch "Ω" at position:	-	
Measuring equipment: Voltmeter	If reading O.K., con- tinue testing with test step 2.	<u>Operation:</u> Power supply Timing advance unit term.10 and term.1
Measuring range: 0...15 V		
Connection: Test socket/test well red (+) Test socket/test well black (-)		<u>Malfunction:</u> No voltage reading
Operation on motorcycle: (Timing advance unit not con- nected) Switch on ignition switch and emergency ignition switch.		



× 1 = Timing advance unit plug

Trouble-shooting:

If set value of approx. battery voltage was not reached, test for open circuit in cable from positive battery terminal to ignition switch through emergency ignition switch to timing advance unit plug term.10 and in cable from negative battery terminal to timing advance unit plug term.1. Eliminate open circuit.

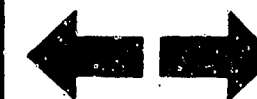
C12

Test chart for universal test adapter
BMW motorcycle



C13

Test chart for universal test adapter
BMW motorcycle

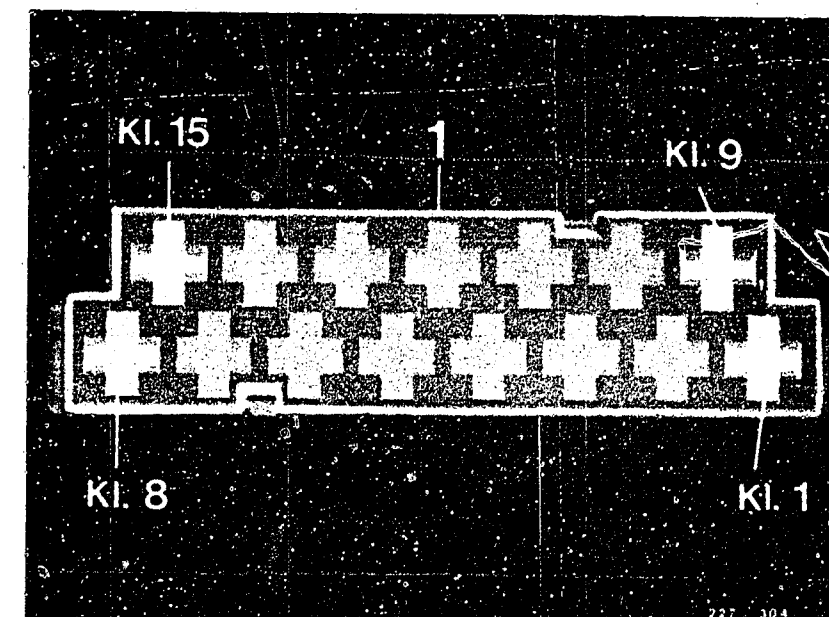


Test step 2			
Operation		Reading	Testing
Program switch "V" at position	2	On voltmeter: approx. battery voltage If reading O.K., continue testing with test step 3.	Component: Electric fuel pump relay (control circuit)
Program switch "Ω" at position:	-		
Measuring equipment: Voltmeter			Operation:
Measuring range: 0...15 V			Power supply (+) Electric fuel pump relay
Connection: Test socket/test well red (+) Test socket/test well black (-)			Malfunction: No voltage reading
Operation on motorcycle: (Timing advance unit not connected) Switch on ignition switch and emergency ignition switch.			

Trouble-shooting:

If set value of approx. battery voltage was not reached, test for open circuit in cable from ignition switch to emergency ignition switch through electric fuel pump relay term.86, through pull-in winding of electric fuel pump relay to term.85 and to timing advance unit plug term.7.

Eliminate open circuit.



> 1 = Timing advance unit plug

C14

Test chart for universal test adapter
BMW motorcycle

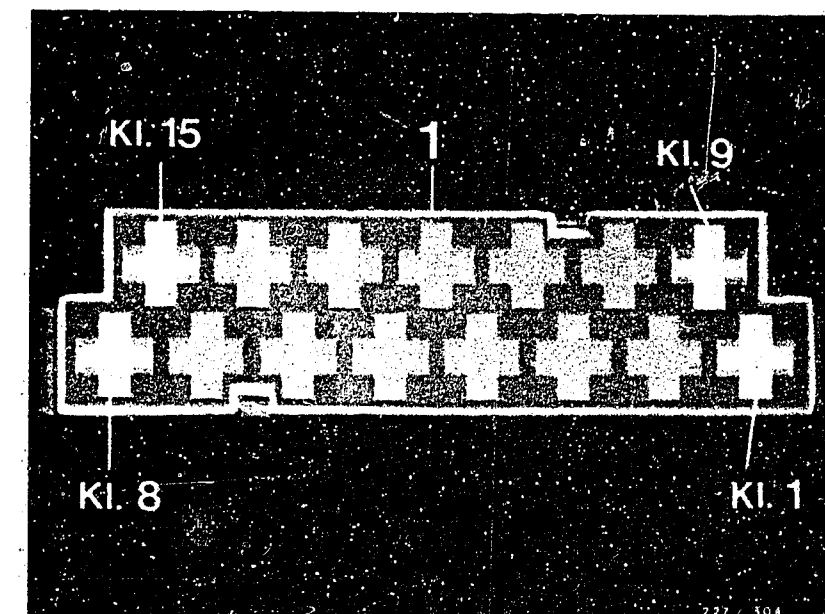


C15

Test chart for universal test adapter
BMW motorcycle



<u>Test step 3</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V"</u> <u>at position</u>	3	On voltmeter: approx. <u>half</u> battery voltage. If reading O.K., con- tinue testing with test step 4.	<u>Component:</u> Ignition coil primary circuit
<u>Program switch "Ω "</u> <u>at position:</u>	-		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage supply Ignition coil 1
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			<u>Malfunction:</u> No voltage reading
<u>Operation on motorcycle:</u> (Timing advance unit not con- nected) Switch on ignition switch and emergency ignition switch.			



1 = Timing advance unit plug

Trouble-shooting:

If set value of approx. half battery voltage was not reached, test for open circuit in cable from ignition switch to emergency ignition switch through ignition coil term.15, primary winding, ignition coil term.1 to timing advance unit plug term.14. Eliminate open circuit.

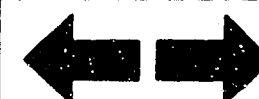
C16

Test chart for universal test adapter
BMW motorcycle

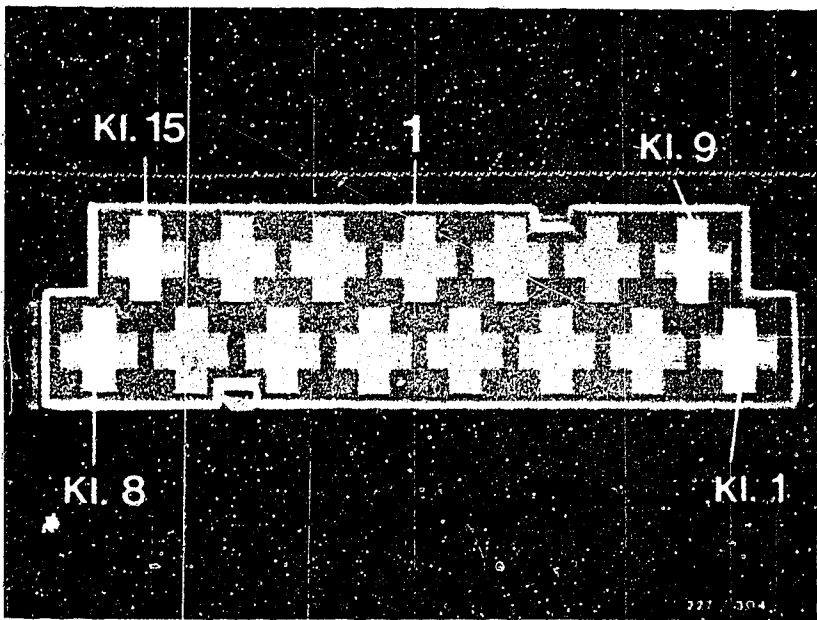


C17

Test chart for universal test adapter
BMW motorcycle



<u>Test step 4</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V"</u> <u>at position</u>	4	On voltmeter: approx. <u>half</u> battery voltage. If reading O.K., con- tinue testing with test step 5.	<u>Component:</u> Ignition coil primary circuit
<u>Program switch "Ω"</u> <u>at position:</u>	-		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Voltage supply Ignition coil 2
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			<u>Malfunction:</u> No voltage reading
<u>Operation on motorcycle:</u> (Timing advance unit not con- nected) Switch on ignition switch and emergency ignition switch.			



1 = Timing advance unit plug

Trouble-shooting:

If set value of approx. half battery voltage was not reached, test for open circuit in cable from ignition switch to emergency ignition switch through ignition coil term.15, primary winding, ignition coil term.1 to timing advance unit plug term.9. Eliminate open circuit.

C18

Test chart for universal test adapter
BMW motorcycle

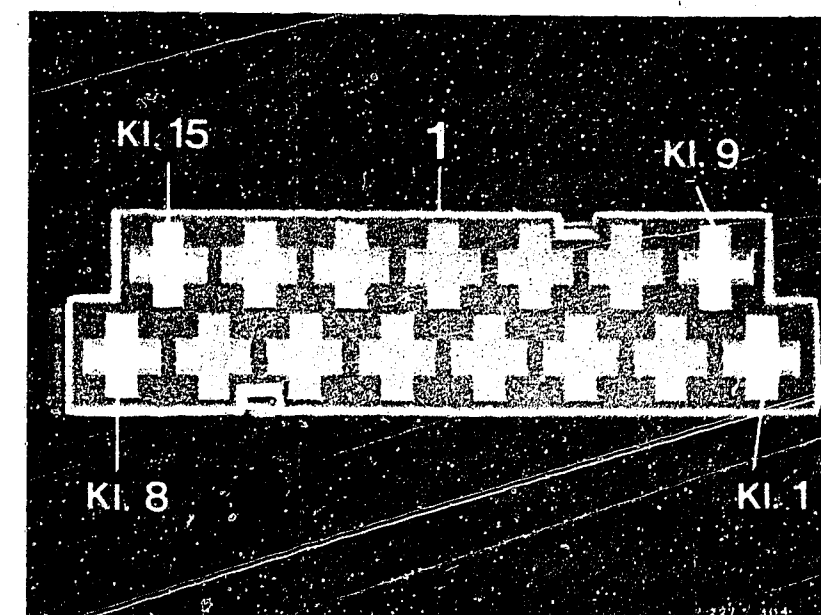


C19

Test chart for universal test adapter
BMW motorcycle



Test step 5		
Operation		Reading
Program switch "V" at position	5	On voltmeter: approx. <u>half</u> battery voltage. If reading O.K., continue testing with test step 6.
Program switch "Ω" at position:	-	
Measuring equipment: Voltmeter		
Measuring range: 0...15 V		
Connection: Test socket/test well red (+) Test socket/test well black (-)		
Operation on motorcycle: (Timing advance unit not connected) Switch on ignition switch and emergency ignition switch.		
		Testing
		Component: Ignition coil primary circuit
		Operation: Voltage supply Ignition coil 3
		Malfunction: No voltage reading



1 = Timing advance unit plug

Trouble-shooting:

If set value of approx. half battery voltage was not reached, test for open circuit in cable from ignition switch to emergency ignition switch through ignition coil term.15, primary winding, ignition coil term.1 to timing advance unit plug term.12. Eliminate open circuit.

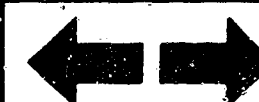
C20

Test chart for universal test adapter
BMW motorcycle

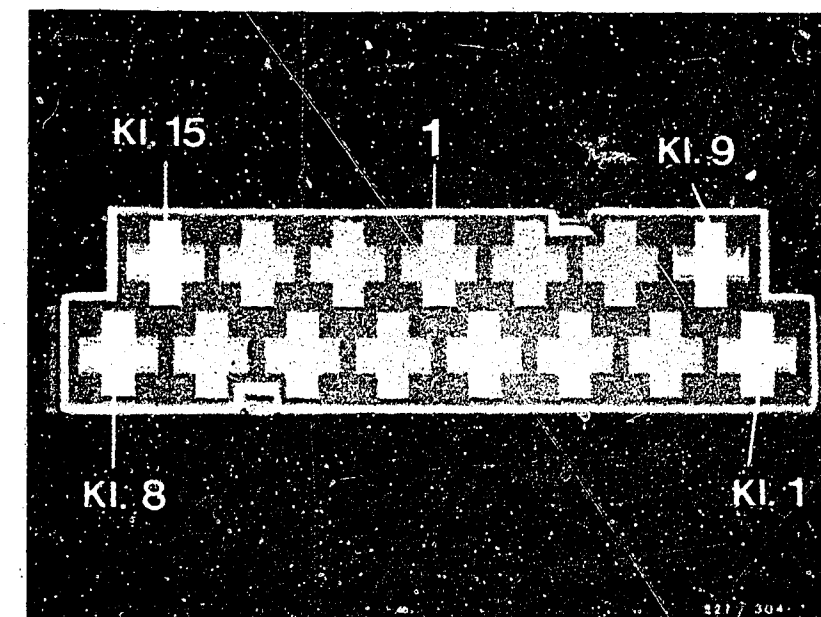


C21

Test chart for universal test adapter
BMW motorcycle



Test step 6		
Operation		Reading
Program switch "V" at position	6	On voltmeter: approx. battery voltage If reading O.K., continue testing with test step 7.
Program switch "Ω" at position	-	
Measuring equipment: Voltmeter		
Measuring range: 0...15 V		
Connection: Test socket/test well red (+) Test socket/test well black (-)		
Operation on motorcycle: (Timing advance unit not connected). Switch on ignition switch and emergency ignition switch. Pull clutch lever fully. Operate starting switch (Starting motor does not operate)		
		Testing
		Component: Starting switch, clutch switch
		Operation: Starting switch
		Malfunction: No voltage reading



1 = Timing advance unit plug

Trouble-shooting:

If set value of approx. battery voltage was not reached, test for open circuit in cable from ignition switch to emergency ignition switch, through clutch switch to starting switch. Eliminate open circuit.

C22

Test chart for universal test adapter
BMW motorcycle

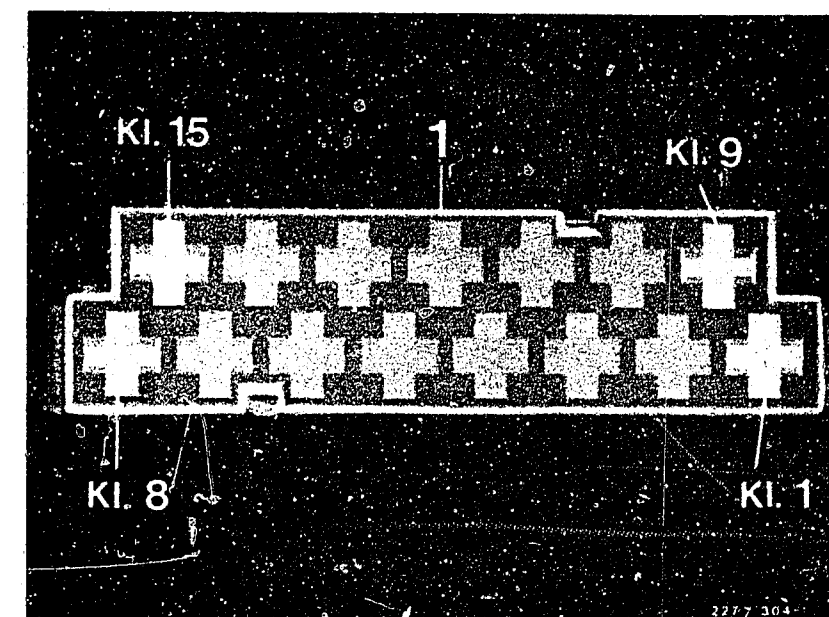


C23

Test chart for universal test adapter
BMW motorcycle



Test step 7		
Operation		Reading
Program switch "V" at position	7	On voltmeter: approx. battery voltage If reading O.K., con- tinue testing with test step 8.
Program switch "Ω" at position	-	
Measuring equipment: Voltmeter		
Measuring range: 0...15 V		
Connection: Test socket/test well red (+) Test socket/test well black (-)		
Operation on motorcycle: (Timing advance unit not con- nected). Switch on ignition switch and emergency ignition switch. Pull clutch lever fully. Operate starting switch (starting motor does not operate).		



1 = Timing advance unit plug

Trouble-shooting:

If set value of approx. battery voltage was not reached, test for open circuit in cable from ignition switch through emergency ignition switch, through clutch switch, through starting switch, through starting interlock relay (term.86, pull-in winding, term.85) to timing advance unit plug term.11.
Eliminate open circuit.

D1

Test chart for universal test adapter
BMW motorcycle



D2

Test chart for universal test adapter
BMW motorcycle



Test step 8			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	8	On voltmeter: 0 V If reading O.K., con- tinue testing with test step 9.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			
<u>Operation on motorcycle:</u> Switch off ignition switch. Connect timing advance unit. Switch on ignition switch and emergency ignition switch.			<u>Operation:</u> Ground connection in trigger box term.4 (ignition trigger unit shielding)
			<u>Malfunction:</u> Voltage reading approx. battery voltage

Trouble-shooting:

If set value of 0 V was not reached, replace timing advance unit.

D3

Test chart for universal test adapter
BMW motorcycle



D4

Test chart for universal test adapter
BMW motorcycle



Test step 9			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	9	On voltmeter: 0 V If reading O.K., continue testing with test step 10.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Ground connection in timing advance unit term.3 (ignition trigger unit)
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			<u>Malfunction:</u> Voltage reading approx. battery voltage
<u>Operation on motorcycle:</u> (Timing advance unit connected) Switch on ignition switch and emergency ignition switch.			

Trouble-shooting:

If set value of 0 V was not reached, replace timing advance unit.

D5

Test chart for universal test adapter
BMW motorcycle

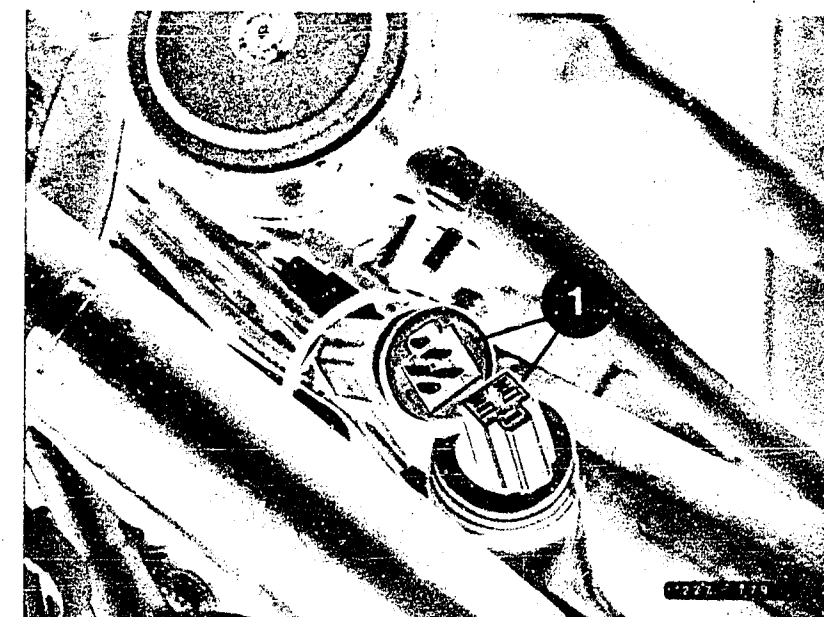


D6

Test chart for universal test adapter
BMW motorcycle



<u>Test step 10</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V"</u> <u>at position</u>	10	On voltmeter: approx. 10 V If reading O.K., con- tinue testing with test step 11.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			
<u>Operation on motorcycle:</u> (Timing advance unit connected) Switch on ignition switch and emergency ignition switch.			<u>Malfunction:</u> No voltage reading



1 = Ignition trigger unit plug connector

Trouble-shooting:

If set value of approx. 10 V was not reached, disconnect ignition trigger unit plug connector. See picture.
If set value is now reached, replace ignition trigger unit.
If set value not yet reached, replace timing advance unit.

D7

Test chart for universal test adapter
BMW motorcycle

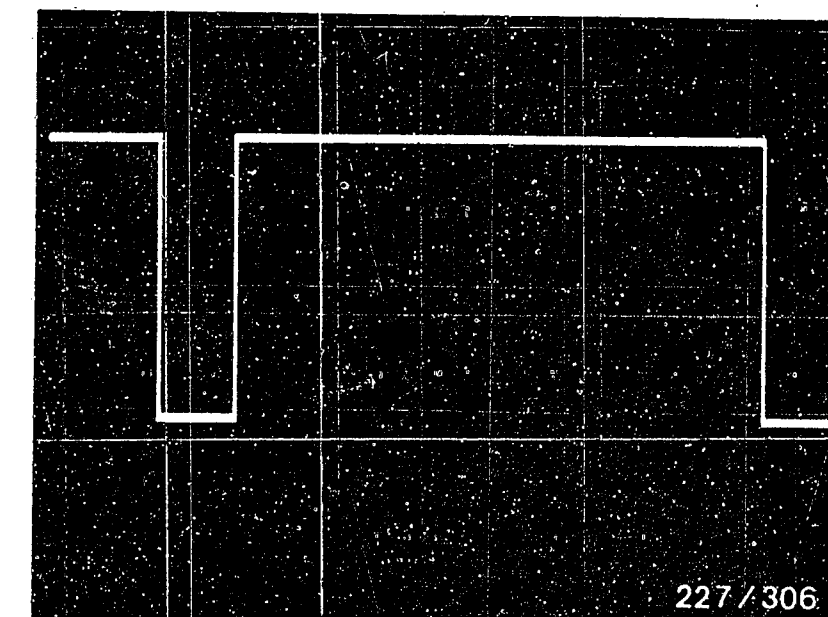


D8

Test chart for universal test adapter
BMW motorcycle

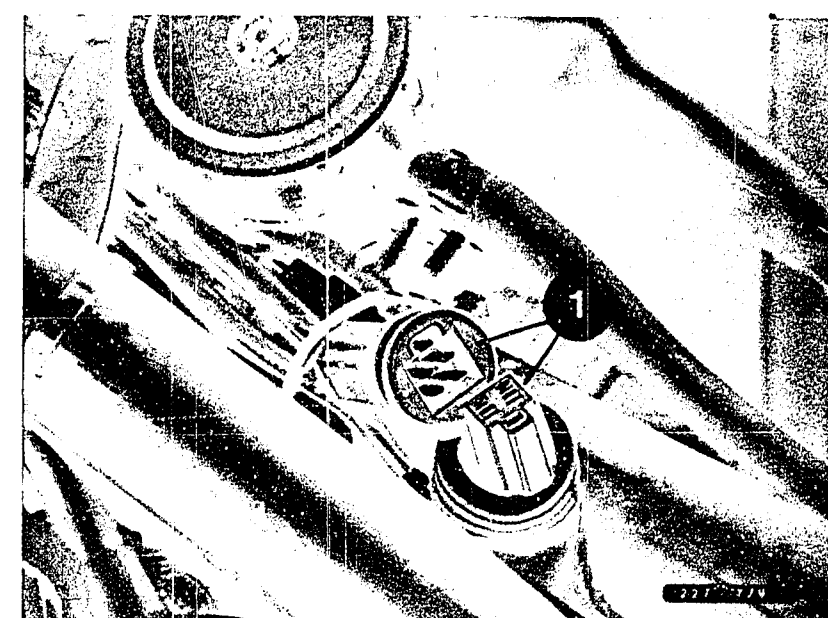


<u>Test step 11</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V"</u> <u>at position</u>	12	On oscilloscope: rectangular pulse If reading O.K., con- tinue testing with test step 13.	<u>Component:</u> Ignition trigger unit including connecting cable
<u>Program switch "Ω "</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Oscilloscope "special input"			<u>Operation:</u> Igniton trigger unit delivers rectangular pulse (on/off ratio) to timing advance unit term.5
<u>Measuring range:</u> 0...100 %			
<u>Connection:</u> Red clip to red test well (+), black clip to black test well (-)			<u>Malfunction:</u> No rectangular pulse
<u>Function on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ign. switch. Pull clutch lever all the way. Start or idle engine.			



Rectangular pulse

1 = Ignition trigger unit plug connector



Trouble-shooting:

If no rectangular pulse, switch off ignition switch.
Disconnect timing advance unit plug from universal test adapter.
Disconnect ignition trigger unit plug connector. See bottom picture.



For trouble-shooting see D11/D12

D9

Test chart for universal test adapter
BMW motorcycle

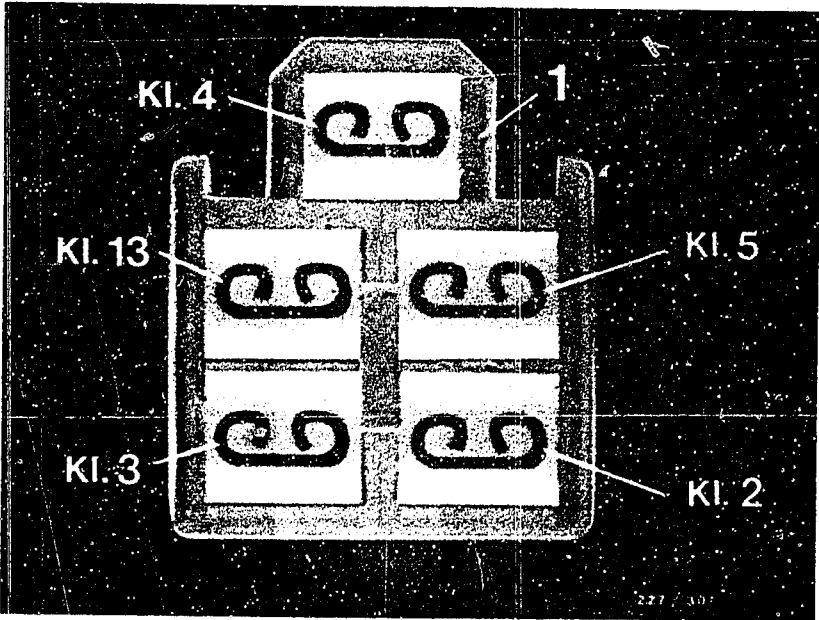


D10

Test chart for universal test adapter
BMW motorcycle



<u>Test step 11 (continued)</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V" at position</u>	12		<u>Component:</u>
<u>Program switch "Ω" at position</u>	-		
<u>Measuring equipment:</u>			
<u>Measuring range:</u>			<u>Operation:</u>
<u>Connection:</u>			
<u>Operation on motorcycle:</u>			<u>Malfunction:</u>



1 = Ignition trigger unit socket
(top view from front)

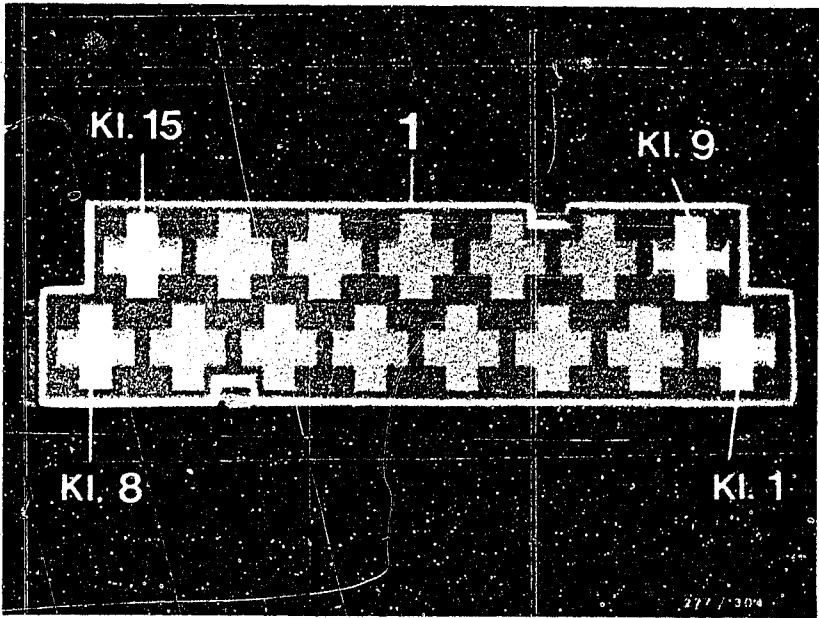
1 = Timing advance unit plug

Trouble-shooting: (continued from D9/10)

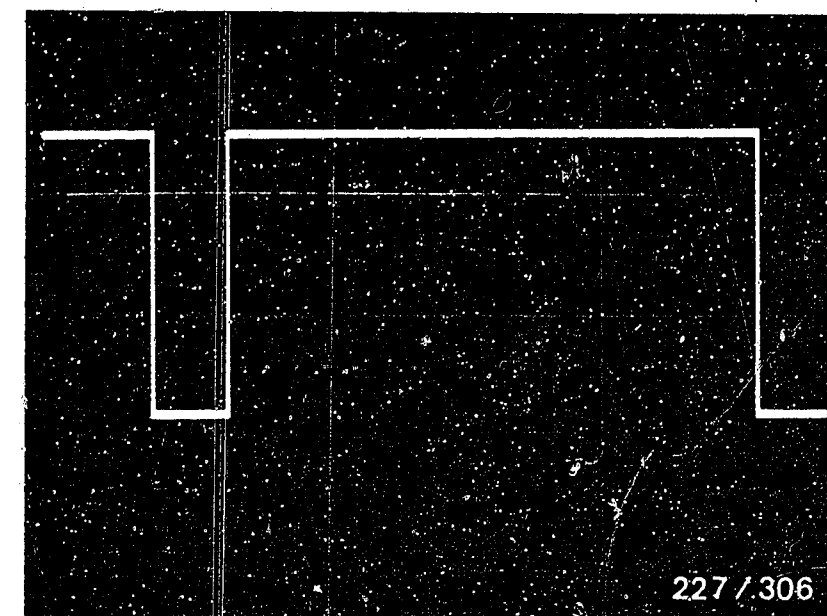
Connect ohmmeter with test prods one after the other to:

Timing advance unit plug		Ignition trigger unit socket
term. 5	and	term. 5
term. 2	and	term. 2
term. 3	and	term. 3

Ohmmeter must indicate approx. 0 Ω in each case.
 If approx. 0 Ω indicated, replace ignition trigger unit.
 If infinity (∞) indicated, eliminate open circuit between timing advance unit plug and ignition trigger unit socket.

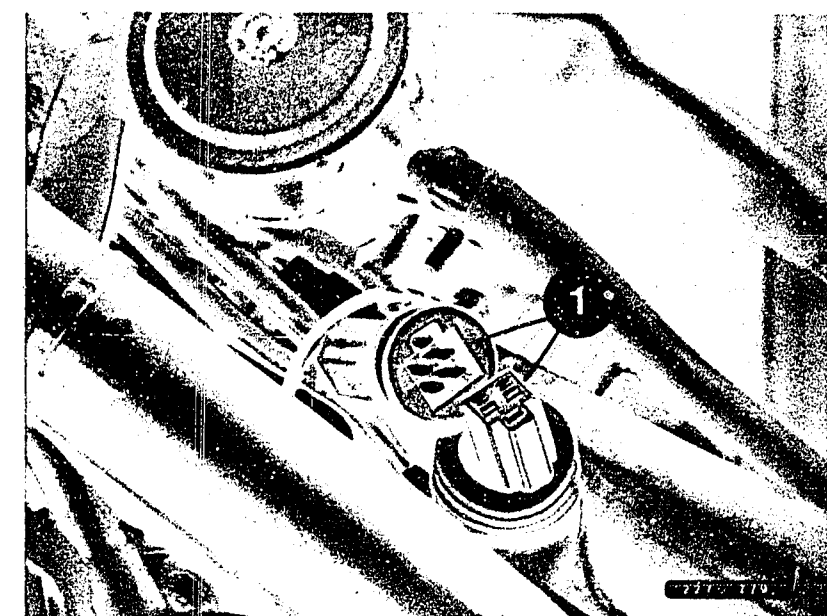


<u>Test step 12</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V" at position</u>	13	On oscilloscope rectangular pulse If reading O.K., continue testing with test step 14.	<u>Component:</u> Ignition trigger unit including connecting cable
<u>Program switch "Ω" at position</u>	-		
<u>Measuring equipment:</u> Oscilloscope "special input"			<u>Operation:</u> Ignition trigger unit delivers rectangular pulse (on/off ratio) to timing advance unit term.13
<u>Measuring range:</u> 0...100 %			
<u>Connection:</u> Red clip to red test well (+) black clip to black test well (-)			
<u>Function on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ign. switch. Pull clutch lever all the way. Start or idle engine.			<u>Malfunction:</u> No rectangular pulse



Rectangular pulse

1 = Ignition trigger unit plug connector



Trouble-shooting:

If no rectangular pulse, switch off ignition switch.
Disconnect timing advance unit plug from universal test adapter.
Disconnect ignition trigger unit plug connector. See bottom picture.



For trouble-shooting see D15/D16

D13

Test chart for universal test adapter
BMW motorcycle

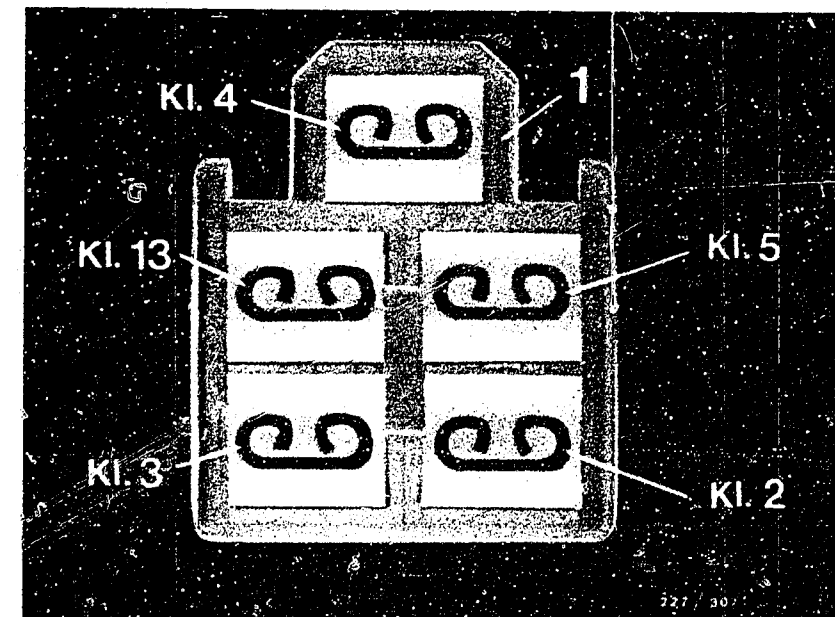


D14

Test chart for universal test adapter
BMW motorcycle

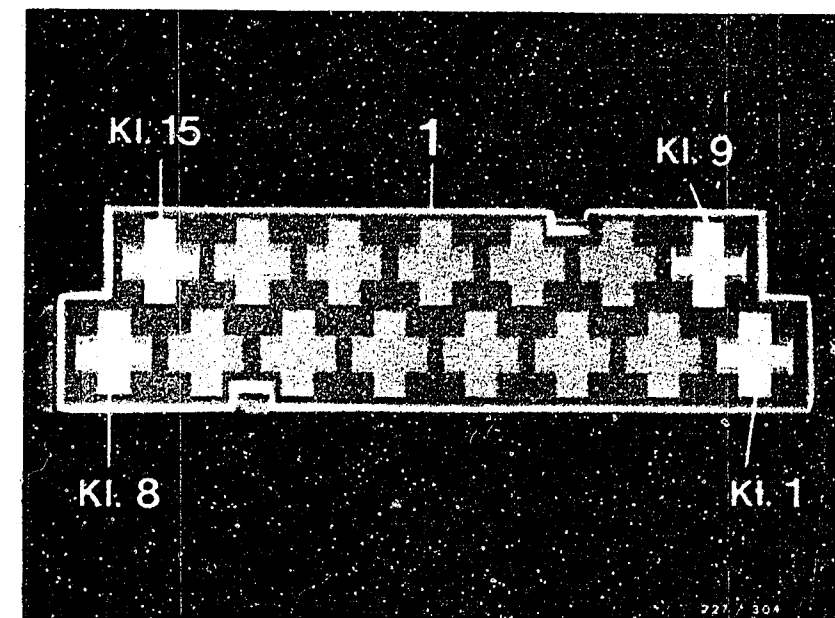


Test step 12 (continued)			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V" at position</u>	13		<u>Component:</u>
<u>Program switch "Ω " at position</u>	-		
<u>Measuring equipment:</u>			<u>Operation:</u>
<u>Measuring range:</u>			
<u>Connection:</u>			
<u>Operation on motorcycle:</u>			<u>Malfunction:</u>



1 = Ignition trigger unit socket
(top view from front)

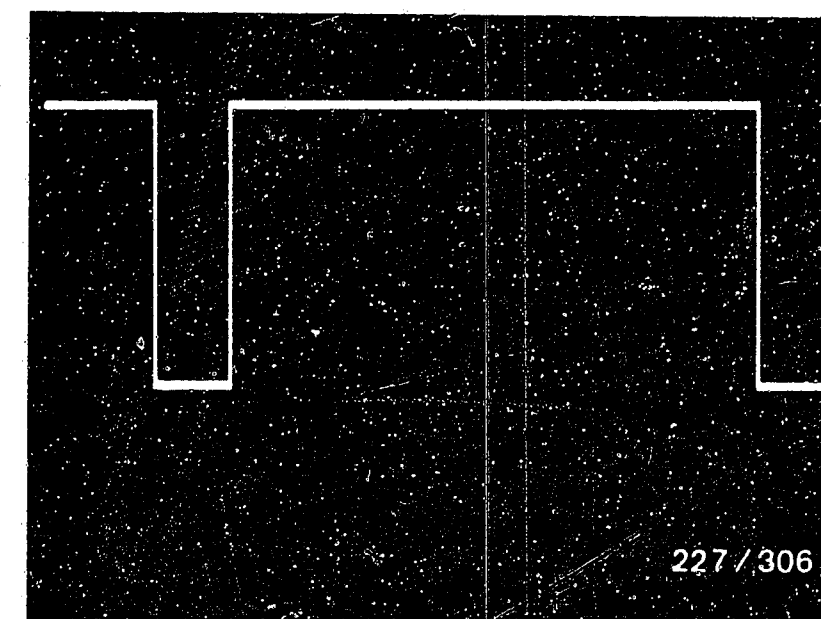
1 = Timing advance unit plug



Trouble-shooting (continued from D13/D14)

Connect ohmmeter with test prods to timing advance unit plug term.13 and ignition trigger unit socket term.13.
Ohmmeter must indicate approx. 0Ω . If approx. 0 Ω indicated, replace ignition trigger unit.
If infinity (∞) indicated, eliminate open circuit between timing advance unit plug and ignition trigger unit socket.

Test step 13			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	14	On oscilloscope rectangular pulse If reading O.K., con- tinue testing with test step 15.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Oscilloscope "special input"			
<u>Measuring range:</u> 0...100 %			
<u>Connection:</u> Red clip to red test well (+) black clip to black test well (-)			
<u>Operation on motorcycle:</u> (Spark-advance unit connected). LE-Jetronic control unit plug is connected. Switch on ignition switch and emergency ign. switch. Pull clutch lever all the way. Start or idle engine.			<u>Operation:</u> Timing advance unit term.8 delivers rectangular pulse (on/off ratio) to LE-Jetronic term.1
			<u>Malfunction:</u> No rectangular pulse



Rectangular pulse

Trouble-shooting:

If no rectangular pulse was attained, try replacing LE-Jetronic control unit/spark-advance unit.

Note:

Rectangular pulse is produced only when LE-Jetronic control unit is intact.

D17

Test chart for universal test adapter
BMW motorcycle

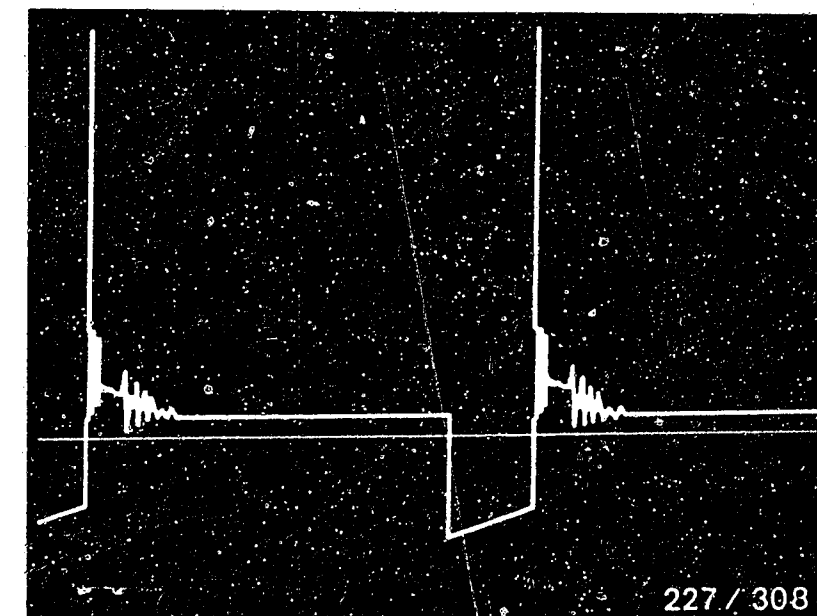


D18

Test chart for universal test adapter
BMW motorcycle



Test step 14			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	15	On oscilloscope: primary signal If reading O.K., con- tinue testing with test step 16.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω "</u> <u>at position</u>	-		
Measuring equipment: Oscilloscope "special input"			
Measuring range: ---			
Connection: Red clip to red test well (+), black clip to black test well (-)			<u>Operation:</u> Primary signal, output stage "on and off"
Function on motorcycle: (Spark-advance unit connected). Switch on ignition switch and emergency ign. switch. Pull clutch lever all the way. Start or idle engine.		<u>Malfunction:</u> No primary signal	



Primary signal

Trouble-shooting:

If no primary signal, replace timing advance unit.

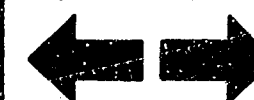
D 19

Test chart for universal test adapter
BMW motorcycle



D 20

Test chart for universal test adapter
BMW motorcycle



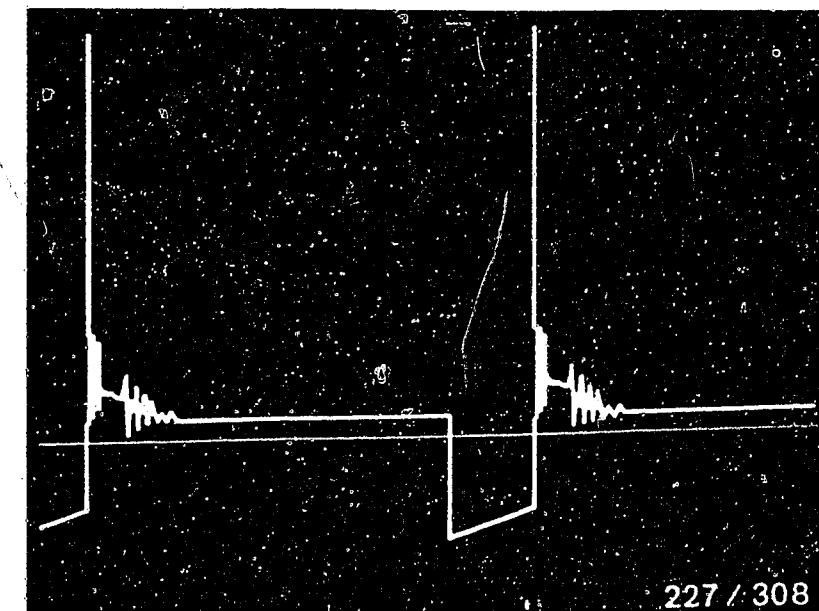
Test step 15			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position:</u>	15	On voltmeter: after max. 5 sec. voltage reading must change to approx. <u>half battery voltage.</u> If reading O.K., con- tinue testing with test step 16.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position:</u>	-		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 0...15 V			<u>Operation:</u> Peak-coil-current cut-off
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			
<u>Operation on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ignition switch. Pull clutch lever all the way. Brief- ly start engine or idle engine. Press key 3 on universal test adapter (only if engine is running).			<u>Malfunction:</u> Voltage reading < 2 V

Trouble-shooting:

If after 5 sec. a voltage < 2 V was indicated, replace timing advance unit.



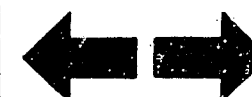
Test step 16			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	16	On oscilloscope: primary signal If reading O.K., con- tinue testing with test step 17.	<u>Component:</u> Timing advance unit
<u>Program switch " Ω "</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Oscilloscope "special input"			<u>Operation:</u> Primary signal, output stage "on and off"
<u>Measuring range:</u> ---			
<u>Connection:</u> Red clip to red test well (+) black clip to black test well (-)			
<u>Function on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ign. switch. Pull clutch lever all the way. Start or idle engine.		<u>Malfunction:</u> No primary signal	



Primary signal

Trouble-shooting:

If no primary signal, replace timing advance unit.



Test step 17			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	16	On voltmeter: after max. 5 sec. voltage reading must change to approx. <u>half battery voltage.</u>	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 0...15 V		If reading O.K., con- tinue testing with test step 18.	<u>Operation:</u> Peak-coil-current cut-off
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			
<u>Operation on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ignition switch. Pull clutch lever all the way. Brief- ly start engine or idle engine. Press key 3 on universal test adapter (only if engine is running).			
			<u>Malfunction:</u> Voltage reading < 2 V

Trouble-shooting:

If after 5 sec a voltage < 2 V was indicated, replace
timing advance unit.

E1

Test chart for universal test adapter
BMW motorcycle

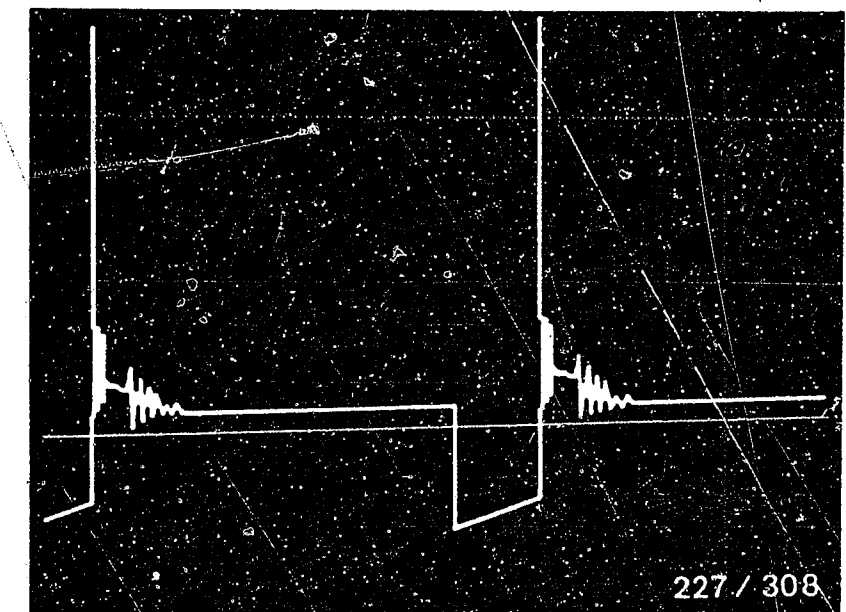


E2

Test chart for universal test adapter
BMW motorcycle



Test step 18			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	17	On oscilloscope: primary signal If reading O.K., con- tinue testing with test step 19.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Oscilloscope "special input"			
<u>Measuring range:</u> ---			<u>Operation:</u> Primary signal, output stage "on and off"
<u>Connection:</u> Red clip to red test well (+) black clip to black test well (-)			
<u>Function on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ign. switch. Pull clutch lever all the way. Start or idle engine.			<u>Malfunction:</u> No primary signal



Primary signal

Trouble-shooting:

If no primary signal, replace timing advance unit.

E3

Test chart for universal test adapter
BMW motorcycle



E4

Test chart for universal test adapter
BMW motorcycle



Test step 19		Reading	Testing
Operation			
<u>Program switch "V"</u> <u>at position</u>	17	On voltmeter: after max. 5 sec. voltage reading must change to approx. <u>half battery voltage.</u> If reading O.K., con- tinue testing with test step 20.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			
<u>Measuring range:</u> 0...15 V			<u>Operation:</u> Peak-coil-current cut-off
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black (-)			
<u>Operation on motorcycle:</u> (Spark-advance unit connected). Switch on ignition switch and emergency ignition switch. Pull clutch lever all the way. Brief- ly start engine or idle engine. Press key 3 on universal test adapter (only if engine is running).			<u>Malfunction:</u> Voltage reading < 2 V

Trouble-shooting:

If after 5 sec a voltage < 2 V was indicated, replace timing advance unit.

E5

Test chart for universal test adapter
BMW motorcycle

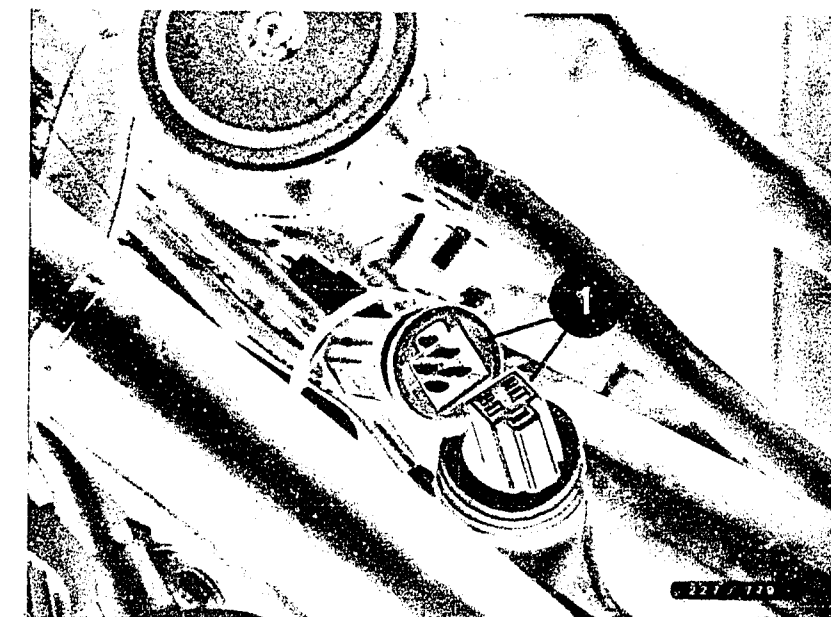


E6

Test chart for universal test adapter
BMW motorcycle



<u>Test step 20</u>			
<u>Operation</u>		<u>Reading</u>	<u>Testing</u>
<u>Program switch "V"</u> <u>at position</u>	7	On voltmeter: < 2 V If reading O.K., con- tinue testing with test step 21.	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Power supply Timing advance unit term.11 (negative) for starting interlock relay
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black 			



1 = Ignition trigger unit plug connector

Trouble-shooting:

If set value of < 2 V was not reached, replace timing advance unit.
If set value of < 2 V reached, but starting motor not operating, test starting interlock relay and starting motor for proper operation, and test connecting cables for open circuit.
Eliminate open circuit. Replace defective parts.

E7

Test chart for universal test adapter
BMW motorcycle

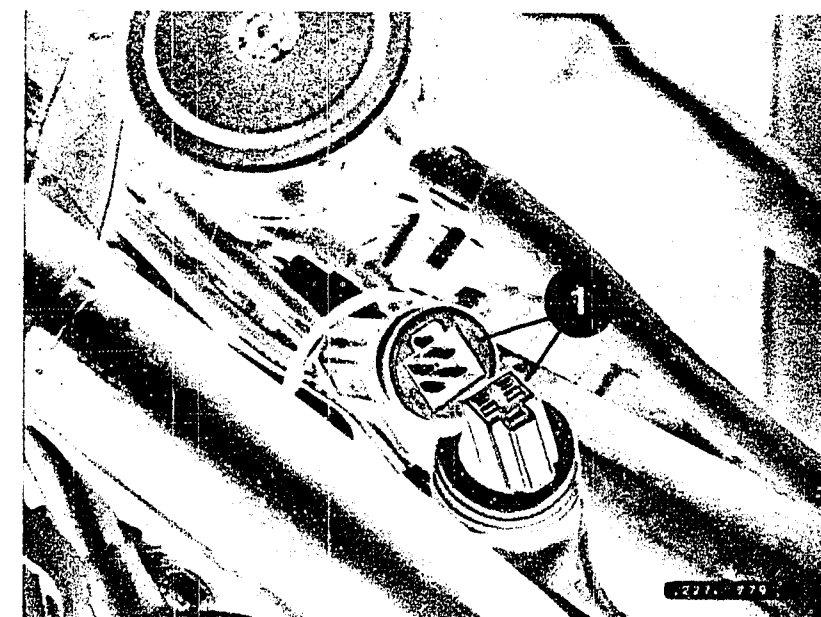


E8

Test chart for universal test adapter
BMW motorcycle



Test step 21			
Operation		Reading	Testing
<u>Program switch "V"</u> <u>at position</u>	2	On voltmeter: < 2 V	<u>Component:</u> Timing advance unit
<u>Program switch "Ω"</u> <u>at position</u>	-		
<u>Measuring equipment:</u> Voltmeter			<u>Operation:</u> Power supply Timing advance unit term.7 (negative) for electric fuel pump relay
<u>Measuring range:</u> 0...15 V			
<u>Connection:</u> Test socket/test well red (+) Test socket/test well black 			



1 = Ignition trigger unit plug
connector

Trouble-shooting:

If set value of < 2 V was not reached, replace timing advance unit.
If set value of < 2 V reached, but electric fuel pump not operating,
test electric fuel pump relay and electric fuel pump for proper operation,
and test connecting cables for open circuit.
Eliminate open circuit, or replace defective parts.

E9

Test chart for universal test adapter
BMW motorcycle



E10

Test chart for universal test adapter
BMW motorcycle



Testing with universal test adapter is completed.

If all test steps were OK but the customer complaint has still not been eliminated or there is still no secondary signal, try installing the prescribed ignition coil.

If customer complaint is still not eliminated, re-install old ignition coil.

Ignition system OK

Further defects may be present in the fuel system, or the engine may be mechanically out of order.

E11

Test chart for universal test adapter
BMW motorcycle



After-sales Service

Technical Bulletin

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22

Danger of Accident on Semi-conductor Ignition Systems

VDT-I-227/102 B

11.1976

Please be sure to pass this bulletin on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufactures starting to equip their vehicles with semi-conductor ignition systems as original equipment. In most cases the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" parts or contacts (whether on the primary side or the secondary side) can prove fatal.

In this connection we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems the ignition is to be switched off. Included in such work are the following operations:

- Connection of engine testing equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of ignition system parts (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.).

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

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N1

Technical Bulletin

BMW motorcycle

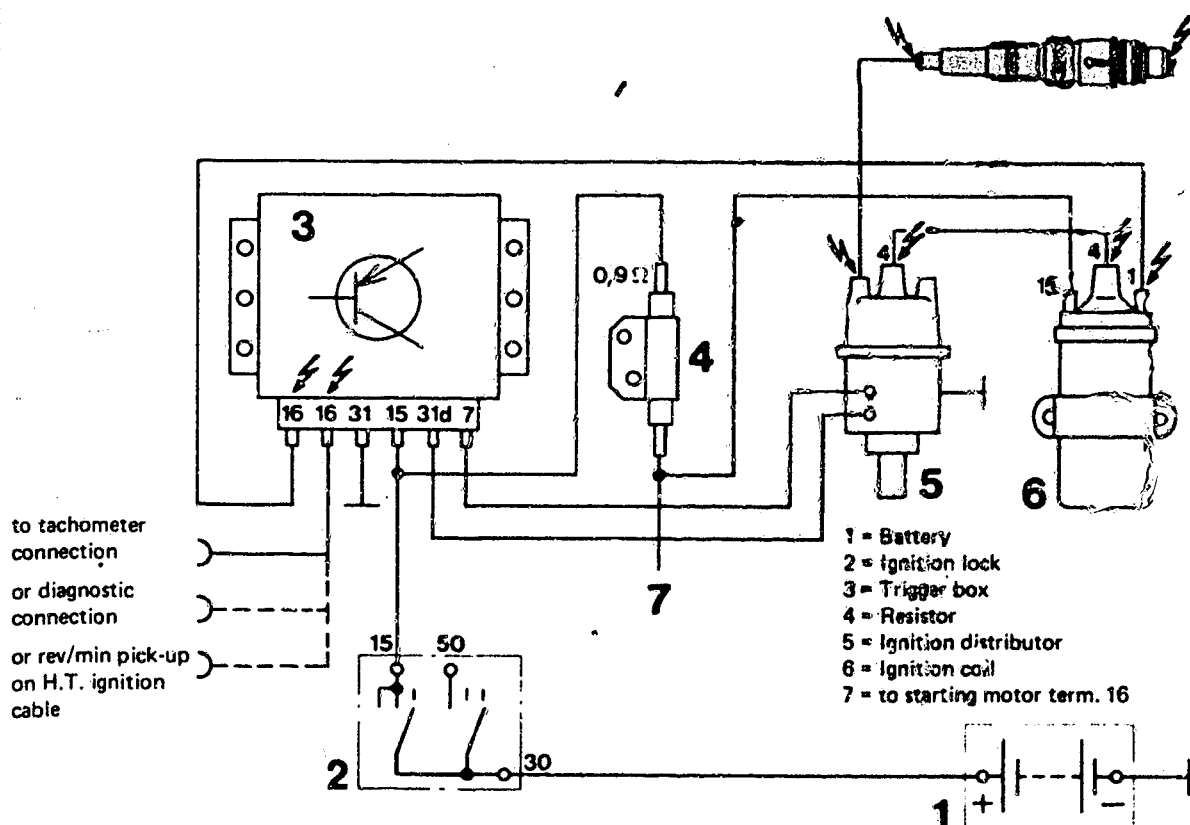


In addition, in the case of the capacitor-discharge ignition system (CDi), danger of accident is also present under the following circumstances:

- Operation of the trigger box without the ignition transformer.
- At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Below is a typical terminal diagram of a semi-conductor ignition system, the danger points are marked with red high-voltage arrows. We would point out that all semi-conductor ignition systems, even the older ones, are to be regarded as dangerous in the sense as defined by this bulletin.

Please address any queries or comments concerning the contents of this publication to our representative in your country.



Terminal diagram



After-sales Service

Technical Bulletin

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EFFECTS OF ELECTRICAL AND ELECTRONIC
SYSTEMS ON HEART PACEMAKERS

VDT-I-227/107 En
1.1981

e.g. ignition systems, Jetronic, Motronic, ABS

Please ensure without fail that this Bulletin is passed on to your employees for their attention!

We have often been asked by some of our customers whether or not patients with heart pacemakers are endangered in any way by ignition systems. This theme was recently the subject of an examination carried out by the Ignition System Development Department of Robert Bosch GmbH in conjunction with Dr. Thull, lecturer at the Central Institute for Biomedical Technology at the University of Erlangen-Nürnberg and Biotronic GmbH & Co. of Berlin, a manufacturer of heart pacemakers. The magazine "Biomedizinischen Technik" (5/80) listed the results.

The most important discoveries in this practice can be summarized from the examination report as follows:-

1. Heart pacemakers corresponding to the latest state of the art are not affected by radiation (electromagnetic fields) from ignition systems.
2. With a stationary engine and the ignition switched off the heart pacemaker is not affected by any part of the ignition system, even when unintentionally touched. Maintenance work in the engine compartment, for example, can then be carried out without any danger.
3. With the engine running or stationary with the ignition switched on, touching current-carrying parts of the ignition system, as well as parts of any other electrical system, presents a certain danger for everybody. The heart pacemaker can here be affected under certain conditions (voltage, current and frequency).
Patients with heart pacemakers should therefore at all costs avoid touching current-carrying parts of electrical systems.
4. Furthermore, patients with heart pacemakers are more inclined to psychic shock effects than other people, even when they receive just a harmless electric shock, because many such patients are conscious of the increased danger to the cardiac activity.

We therefore consider it inadvisable for patients with heart pacemakers to be employed in workshops or on vehicles where ignition systems are being tested or repaired. If any members of your staff have heart pacemakers please carry out the necessary measures.

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N3

Technical Bulletin
BMW motorcycle



We would like to add that heart pacemakers are not expected to be affected in any way by interference from other electronic products and systems which we manufacture, such as the Antiskid System (ABS), Jetronic, Motronic, because the much greater radiation intensity of the ignition systems examined in normal use has not caused any interference to heart pacemakers corresponding to the latest state of the art.

If you should receive questions on this matter from customers, please inform them accordingly.



After-sales Service

Technical Bulletin

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NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En

1.1983

The introduction of new ignition systems has made it necessary to reclassify all designations.

The designations listed below will be used immediately in KH workshop and sales literature.

Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Coil ignition	SZ (CI)	-----	Mechanical (breaker points)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized coil ignition	TSZ-K (TCI-c)	K=breaker-triggered	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Trigger box with conventional circuit techniques	TSZ-I* (TCI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
	TSZ-H	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
Transistorized ignition	TZ-I* (TI-i)	I=Induction-type pulse generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)
(Trigger box in Hybrid technique)	TZ-H* (TI-h)	H=Hall generator	Electronic (trigger box)	Mechanical (ignition distributor)	Mechanical (ignition distributor)

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N5

Technical Bulletin

BMW motorcycle



Designation	Abbrev'd code	Meaning	Switching	Ignition control and spark advance	High-voltage distribution
Breakerless semiconductor ignition with or without knock control	EZ EZ-K	- K=Knock control	Electronic (trigger box or control unit)	Electronic (control unit)	Mechanical (ignition distributor or high-voltage distributor)
Distributorless ignition with or without knock control	VZ VZ-K	- K=Knock control	Electronic (control unit)	Electronic (control unit)	Electronic (dual-spark ignition coil, or 1 ignition coil for each spark plug)

*Note: The ignition system can also be equipped with a DLS unit (digital idle stabilization) or with an ELS unit (electronic idle stabilization) or with an ESV unit (electronic ignition retardation).



After-sales Service

Motor Vehicle Service Information

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TESTS ON ELECTRONIC IGNITION SYSTEMS
(TCI, TZ)
TESTER INSTRUCTIONS

VDT-I-Gen. 035 En
3.1981

The following tests are listed in older and current Tester operating instructions or in Trouble-shooting with the oscillograph.:

- "Separate ignition coil test" (concerns EFAW 213, 214, 268, AE 2000).
- "Calculating the "ignition voltage reserve" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).
- "Intensified insulation test" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7-Information K7-VJF 17/8012.

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N7

Vehicle Service Information

BMW motorcycle



Table of contents

<u>Section</u>	<u>Coordinates</u>
Structure of the microcard	A 1
1. Special features	A 2
2. Rapid diagnosis chart for universal test adapter	A 2
3. Test specifications	A 9
4. Electrical terminal diagram	A 10
5. Installation position of components.	A 12
6. Necessary test equipment and aids ..	A 20
7. Accident hazards with electronic ignition systems	A 21
8. Important vehicle information	A 23
9. Trouble-shooting	B 1
10. Trouble-shooting chart	B 3
11. Trouble-shooting program if secondary signal/flash present	B 7
Trouble-shooting program when no secondary signal/flash present	C 1



Table of contents (continued)

<u>Section</u>	<u>Coordinates</u>
Technical Bulletin (Danger of accident)	N 1
Technical Bulletin (Influence of electrical and electronic systems on heart pacemakers)	N 3
Technical Bulletin (New designations for ignition systems)	N 5
Motor Vehicle Service Information (Tests on electronic ignition systems)	N 7

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